Child health and utilisation of health services in Northeast Thailand

(socio-economic correlates and cultural explanations)

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Declaration

Except where it is indicated otherwise, this thesis is my own work carried out during my PhD study in the Graduate Program in Demography, the National Centre for Development Studies, the Australian National University

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Abstract

This study examines the patterns and importance of maternal and child health care services utilisation and the extent of the use of health services which influence child health in the Northeast of Thailand. Quantitative and qualitative methods were used to analyse two main sources of data: the cross-sectional data of the 1987 Thailand Demographic and Health Survey and the field research conducted in 1992 in one village in Khonkaen province. The modification of the malnutrition-infection syndrome model developed by van Norren and van Vianen was used as a conceptual basis for the study, and logistic regression was used to examine the predictive power of several sets of explanatory variables for child health status. Nutritional status and diarrhoea morbidity were two measures of child health used in this study. Two nutritional status indicators for children aged 6-36 months identified stunting and underweight. Diarrhoeal morbidity was taken to refer to all children aged 0-59 months who experienced diarrhoea in the two weeks prior to the survey.

The study findings indicate that women's use of preventive health services in the Northeast was relatively low. Twenty-two per cent of women did not receive prenatal care, 26 per cent were not given tetanus toxoid injections, 42 per cent of childbirths were assisted by non-modern health providers, and 33 per cent of children aged under five did not possess health record cards. The following conditions were found to reduce the likelihood of using all forms of preventive health service: illiteracy (of the women or their husbands), longer travel time to, longer distance from, and lack of previous contact with health providers, holding place of residence constant. The results also suggested that the local health facilities were under-utilised and that traditional health providers continue to play a major role in providing health care. The results from the case study also revealed dual utilisation of both modern and traditional health services in one Northeast village. Reluctance to use the health centre there was due partly to the perceived inefficiency of the centre, inconvenience, the perceived ineffectiveness of treatment received there, perceived low quality of care, and a negative attitudes towards the local health providers. The use of health services was utilised in the thesis as an interesting variable for child nutritional status and diarrhoea.

Malnutrition was moderately prevalent, based on the international standard: 27 per cent of children aged 6-36 months were chronically malnourished and 35 per

cent were underweight. Growth retardation and diarrhoea began at very young ages. At ages 3-6 months, 12 per cent of children were already stunted, five per cent were underweight, and 14 per cent had diarrhoea. Logistic regression analysis indicated that, controlling for age of child and place of residence, both chronic malnutrition and underweight were significantly influenced by ownership of radio, maternal height, education (of the mother for stunting and of the father for underweight), and utilisation of preventive health services. The strong influence of utilisation of health services supports the view that preventive health measures are useful predictors of child health.

The prevalence of diarrhoea in the Northeast was highly influenced by community variables, place of residence and type of public health services in locations (place of residence was hold constant). This suggests that the improved social and physical environment in urban settings has been instrumental in preventing diarrhoea. Socio-economic variables such as ownership of a refrigerator, radio, and current occupation of mother also had a significant impact on diarrhoea among children under five years of age. Diarrhoea was not always treated or managed in medically appropriate ways. For those who were treated, self-medication was common. In contrast to the TDHS figures, diarrhoeal morbidity was very low in the case study village. The case study found that other infectious diseases, such as fever and cough, were the most prevalent illnesses.

The study strongly suggests the complexity of factors influencing child health and nutritional status. Poor health and low nutritional status must be tackled by addressing the several factors intertwined with the direct causes and consequences of diarrhoea and malnutrition. These include socio-economic and environmental factors, hygienic practices, and the provision and use of health services. Current health intervention to improve the health of the children have placed heavy emphasis on the participation of women. However, the case study found that other family members also played important role in childcare and in decision-making about nutrition and the treatment of illness. Among measures to improve the health of children, maternal and child health intervention should be flexible and take into account the practicalities of local daily activities in order to increase effectiveness and place less of a burden on mothers.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

CHAPTER ONE

Introduction

The purpose of this thesis is to examine the patterns of maternal and child health care utilisation, and to examine the effect of utilisation of health services on child health and nutritional status in the Northeast, where malnutrition and diarrhoea are highly prevalent. Although malnutrition and diarrhoeal diseases are no longer the leading causes of death in Thailand, as a cause of morbidity they remain significant, particularly among young children in the Northeast where the majority of the population are poor, with bad living conditions, and low education. Despite efforts by past and present governments to ensure delivery of health services to wider segments of the population by providing more extensive, uniform and accessible health facilities, the health status of the population is relatively low, especially in rural areas. The persistently high level of malnutrition and of diarrhoeal diseases in the Northeast is believed to be caused primarily by poverty, which is broadly defined to include social, cultural, and environmental dimensions. It can therefore only be alleviated when those factors are successfully addressed, usually with a comprehensive approach.

The provision of health services, though not sufficient to alleviate health problems, is argued to be an essential component of a comprehensive approach. Many of the health problems in young children of developing countries are largely preventable by means of technically simple interventions; therefore, the use of health services is crucial for improving health of a community (Sharpston, 1984: 78; Kielmann et al., 1983; Jain, 1985: 3). Factors such as improved nutrition, personal hygiene, a healthier environment (McKeown et al., 1972; McKeown, 1976; Susser, 1993), changes in demographic characteristics (Dubos, 1965), and rising incomes (Fuchs, 1974) have contributed a great deal to the decline in mortality in developed countries. Evidence from some developing countries suggests that, together with

social and political development, utilisation of health services also plays an important role (Caldwell, 1979 and 1986; Nag, 1983; Gunatilleke, 1985; Panikar, 1985; Summerfield, 1989). Where resources are scarce, health care delivery confronts the dual problems of uneven distribution and the under-utilisation of available facilities. Highly trained health professionals and well-equipped health facilities are concentrated in big cities, while auxiliary health workers and traditional practitioners are the major health resources in rural areas. The traditional health care system, although it has existed for a long time in Thai society and is used extensively among the poor and rural residents in particular, has received little attention from the government. Meanwhile the modern health care system has been the dominant health care form (Mulholand, 1979; Wiwat, 1986; Sermsri, 1989). Although health and illness have a biological basis, responses to illnesses are largely influenced by social and cultural values (Muecke, 1976: 377; Manderson, 1990: xii). Therefore, the full understanding of child health and utilisation of health services needs a wider approach than an exclusively biomedical one. This thesis employs a comprehensive approach in studying child malnutrition and infection. Socio-economic, behavioural, and environmental factors are examined using data from the 1987 Thailand Demographic and Health Survey (TDHS), while case studies in one village in the Northeast are also combined in order to explain the role of the cultural beliefs of the people.

This chapter is divided into five sections. The first provides a background to the study. The objectives of the study are outlined in Section 1.2. Section 1.3 determinants of child nutrition and diarrhoeal diseases, and Section 1.4 reviews findings of previous studies on utilisation of health services. The chapter concludes with an overview of the organisation of the thesis.

1.1 Background to the study

To give a clear picture of the nature of child health and utilisation of health services, it is essential to provide the background of the maternal and child health services in Thailand. As in most societies, Thai women are the prime child carers, particularly

during the first few years of life. The recent innovation of child survival programs has heavily emphasised the participation of women in selective health care measures, such as immunisation, breastfeeding, growth monitoring, and oral rehydration therapy (McGuire and Popkin, 1990: 22-23). Therefore, women's health behaviour, particularly their utilisation of health services, is crucial for the health and survival of children. However, little attention has been given to the behaviour of mothers, partly due to difficulties in its measurement and lack of appropriate behavioural data, especially in administrative records.

A woman's health behaviour is important to child health, particularly the extent to which she uses the available health facilities during pregnancy, childbirth, and lactation. Utilisation of prenatal care is associated with higher birth weight, which is regarded as the most important indicator of an infant's survival (Eisner et al., 1979: 887). Studies that associate prenatal care with improved pregnancy outcomes have been criticised on the basis that the type of women seeking care is the important factor, not the care itself. Those who seek modern health care for themselves or their children tend to be better off, economically and socially. However, a strong relationship is still found between prenatal care and pregnancy outcomes after controlling for socio-demographic factors (Quick et al., 1981). Utilisation of health services is thought to influence health behaviour through knowledge gained in contact with health personnel. For example, prenatal visits enable women to obtain health information on prevention as well as receiving specific medical attention, resulting in lower child morbidity and mortality (Shah and Abbey, 1973; Grant, 1988: 2).

Although the provision of maternal and child health care has been generally associated with better health for children, the unequal distribution of health resources and the under-utilisation of the local facilities are problematic in most developing countries where resources are scarce and most people are poor (Hongvivatana, 1982: 21; Fosu, 1989: 398). Unequal access, as well as the influence of socio-cultural factors, has a significant impact on the utilisation of health

services in most developing countries. Many health resources are concentrated in urban areas, while the majority of the population in rural areas have no access to basic services (Wiwat, 1986: 34). In addition, the nature of the service itself, which tends to be highly medically and technologically advanced, makes it too expensive. Yet the expansion of modern health facilities, by establishing health centres in all sub-districts in Thailand, has not ensured the use of the local health services.

Health care delivery is a specific action to which a government devotes its efforts in order to improve the health status of its population. The health of the most vulnerable groups in society is addressed by maternal and child health (MCH) programs. In most developing countries, including Thailand, existing health services are dominated by western-style medical care and directed towards providing a high standard of care in sophisticated institutions and hospitals which are concentrated in urban areas. Disadvantaged groups have less access to any formal health care (Gallagher, 1984: 251; Newell, 1984: 265; Mosley, 1985: 103; Bryant, 1988: 301; Fosu, 1989: 398). In most developing countries about 80 per cent of the population live in rural areas, and have no access to adequate health care, while three quarters of the health budget is allocated to building and staffing health facilities in urban areas (Macagba, 1985: 223). Health care systems are too often incongruous with the mainstream of social and economic development and frequently medical care has doubtful social relevance, even though the health problems are profoundly attributable to various social and economic constraints, which are beyond the scope of medical care to control. More importantly, most modern medical systems are becoming increasingly complex and costly (Gallagher, 1984: 248; Mosley, 1985: 103). Even though a variety of health programs are expected to reach out of the hospitals to the wider community, in fact this is hardly ever so. In rural areas, health care for women and children is usually the responsibility of auxiliary health workers (Ebrahim, 1978; Wibulpolprasert et al., 1986; Succhai et al., 1988; Sattam, 1992).

According to the Economic and Social Commission for Asia and the Pacific (ESCAP) (1987: 8), many developing countries in the region encounter two serious

health shortcomings. Firstly, despite remarkable improvement in overall health (increases in life expectancy, decreases in infant mortality rates and crude death rates, and improved ratios of doctors and hospital beds per capita), the government health care system has failed to address the issue of prevention, which is crucial to the nature of health burdens of many countries where the majority of the population suffer from malnutrition and infectious diseases. Secondly, health policy has been centralised in character and top-down in implementation. This is considered to be the major obstacle to health development.

In Thailand, the delivery of health services confronts dual problems: uneven distribution and a shortage of qualified health personnel and facilities (Jones and Boonpratuang, 1976; Krongkaew, 1979; ESCAP, 1989). Although the recent official reports have shown a remarkably expanded provision of health and medical care, the distribution of health resources in rural areas has still lagged behind that of urban settings (Ministry of Public Health (MOPH), 1988: 2; ESCAP, 1989: 8). In 1984, as many as forty-nine per cent of physicians and forty-six per cent of nurses worked in the capital city, Bangkok (Wibulpolprasert et al., 1986: 4), while at the community and village levels the health centres and midwives were the prime health resources. In 1985, there were 8,573 midwives and 7,043 health centres all over the country, resulting in a midwife-population ratio of 1:7,022 (Division of Health Statistics, 1986: 255). However, the shortage of health manpower is worse than already described if the doctor-population ratio in provincial cities is considered. For example, in 1984, one doctor served 1,321 people in Bangkok, whereas the corresponding figure for the Northeast was 15,554 people (Wibulpolprasert et al., 1986: 4-7). The imbalance in the distribution of health resources is likely to be more pronounced in the Northeast region where all health resources and services are scarce (Krongkaew, 1979: 42; Chutikul, 1983: 5).

In rural Thailand, maternal and child health services are channelled mainly through the health centres, but have not yet been fully accepted and utilised, particularly the midwifery services. This is reflected in the relatively low attendance

of rural mothers at prenatal clinics and the relatively small proportion of rural childbirths that are supervised by trained health personnel. For example, in 1981, as many as 60 per cent of rural women delivered at home and about 70 per cent of them were attended by untrained traditional midwives (Porapakkham, 1986). The results from the Thailand Demographic and Health Survey revealed a better situation but one still not much improved in rural areas, especially in the Northeast. During the period 1982-1987, although three quarters of pregnant women in rural areas received prenatal care, almost half of them delivered at home; in the Northeast more than half of all pregnancies were delivered at home (Pitaktepsombati and Wongboonsin, 1989: 87). Although health facilities are available at the local level, these facilities are often under-utilised and people by-pass local health resources to attend provincial hospitals. The major reasons for the under-utilisation of such services are the low reputation of the health centres; the fact that health workers are not qualified to provide needed services, especially curative care (Bryant, 1969; MOPH, 1970); and the social distance and interpersonal relationships between health workers and villagers (Rauyajin and Plianbangchang, 1983; Sattam, 1992).

Despite the under-utilisation of the rural health care facilities, the expansion of rural health resources, particularly health centres and health workers, remains the major emphasis of health development in Thailand. The number of health centres has increased steadily. For example, during the period 1982 to 1987 the number of health centres increased from 5,891 to 7,594 with a rate of increase of about four per cent per annum. In 1987, health centres were built in almost all sub-districts (98 per cent) (NESDB, 1989: 22). In order to provide sufficient services to the under-served population, a health centre is expected to have five staff (Nittayarumphong et al., 1991: 83). In practice, however, the 1988 survey of 36 health centres all over the country on knowledge, attitudes, and practices regarding health service shows that an average number of 2.5 health workers staffed each health centre. Slightly more than half of the health centres were staffed by only two health workers, about

one-third had three staff, and only eight per cent of the health centres had four staff (Sirirassamee and Leoprapai, 1988).

The role of the health workers is another important concern for the health development plan. Prior to the formulation of the Primary Health Care (PHC) program, the central role of health workers was to provide health services to the under-served. Individuals and communities were viewed as inactive recipients. From 1977 onwards, this role has become more comprehensive and integrated in order to support and encourage individuals and communities to participate actively in their own health and well-being. Primary Health Care has been evolved as an additional health service in Thailand. It extends from the system rendered by the state at the community and village levels to provide health care to cover all communities by creating community participation and mobilising local village resources. The village health volunteers (VHV) and village health communicators (VHC) are the key community health workers who are selected to perform health services on a voluntary basis. The government provides them with free medical services and a certificate when their training is completed (Office of Primary Health Care, 1985; Porapakkham, 1986). The key subjects of the basic health services training include maternal and child health, nutrition, and sanitation. The organisations are widely linked with other existing community structures, such as village co-operatives. A community is supposed to achieve self-reliance and become self-supportive, starting from self-recognition of its problems, self-planning, and problem-solving with its self-monitoring system. The size or 'quantity' of the program has been well documented officially and almost always indicates the success of the PHC program nationwide, especially in terms of the number of villager volunteers and village co-operatives that have been established. However, the quality of the program is rarely investigated.

Apart from the government health services described above, the private sector continues to provide both modern and traditional health services. However, modern private health services, such as pharmacies, clinics, and hospitals, are

concentrated in towns, while traditional practitioners provide health services largely in rural communities. The dual utilisation of modern and traditional health services is common in many societies, such as Kenya (Kramer and Thomas, 1982), Thailand (Sermsri, 1989), Hong Kong (Andersen, 1987), and Malaysia (Heggenhougen, 1980). People perceive there to be only one health system; traditional and modern medicine are part of the whole system and complement each other in health services (Quah, 1989: 5).

Various factors are believed to influence health care choices between modern and traditional systems including cultural, social, and psychological factors and the organisation of health systems. For example, studies in the United States among non-whites (Dutton, 1978, 1979) and whites (Rundall and Wheeler, 1979) indicated that three factors having the same orders of significance influence choices of health care utilisation, namely a system barrier, cultural values, and insufficient financial coverage. In her study on health care options in rural areas in Morocco, Davis (1988: 72) points out that in spite of wide cultural differences and where both traditional and modern types of health care are available, utilisation of modern medical care is discouraged by system barriers such as social organisation of services, time, energy, effort and distance to health facilities; financial situations of users; and cultural views of illness. Social distance between modern health care providers and users is another burden discouraging people from use of modern health services. Hamid (1983: 195-196) pointed out that women in rural Malaysia viewed traditional and modern midwives as the same in delivery of babies. Although modern midwives were more capable of handling pregnancy and childbirth than traditional midwives, the traditional midwives were held in high regard among rural women and were more likely to be consulted than the modern midwives.

In terms of the choices of treatment, self-medication is common in developing countries. Many reasons have contributed to the widespread use of non-prescribed pharmaceuticals. A study of the choices of treatment for children in the Philippines indicated that people bought drugs for treatment because of their perceptions of the severity of illness, over-prescribing of antibiotics by doctors, and

overwhelming social marketing of modern pharmaceuticals (Hardon and van der Geest, 1987: 470-471). In Brazil, the choices of treatment were influenced by the positive attitudes towards modern pharmaceutical and the notion that every health problem should be treated with medicine (Haak, 1988: 1423).

The health problems related to malnutrition and infections, and under-utilisation of health services indicate that no simple solution can be undertaken to overcome such intricate problems. However, a comprehensive intervention which requires substantial changes in behaviour and outcomes of the population at large including health education, nutrition, and living conditions, is considered to be required, particularly in Northeast Thailand where the majority of the population are afflicted by poor health related to poverty. This thesis hopes to provide useful information and insight regarding these issues in the Northeast.

1.2 Objectives of the study

The study seeks to accomplish the following specific objectives:

1. To examine the relationship between household socio-economic variables, accessibility of health delivery services and the utilisation of preventive health care, which is measured by the following variables: prenatal care, tetanus toxoid injection, birth attendant, and ownership of health record cards.
2. To examine the effects of various demographic, socio-economic, and environmental variables, maternal nutrition, accessibility and use of preventive health care on nutritional status and prevalence of diarrhoea of children under five years of age. Particular attention will be given to the effect of maternal education, because of the evidence from many studies that maternal education is important in influencing many aspects of health and child care (Caldwell, 1986; Cleland and Ginneken, 1988).
3. To explore, using a qualitative approach, the mechanism through which the socio-cultural context affects the health behaviour and health status of children in a rural village.

1.3 Determinants of child health and nutritional status

To understand the influence of causal relations on child morbidity and nutritional status, various determinants which embrace cultural, demographic, socio-economic, environmental, and health intervention factors will be discussed in this section.

Cultural factors. There has been increasing interest in the causal relation between cultural context and maternal and child health. The recent field of health transition, for example, has placed more emphasis on the socio-cultural, and behavioural determinants for a holistic study of health (Caldwell and Santow, 1991: 1). However, no clear definition of the term has so far been identified: the definition is either too narrow or too broad and many see the cultural factors as 'residual factors' when other factors fail to explain variations under examination (van Esterik 1988: 188). The interpretation of a causal relation between culture and health is sometimes inappropriate, as Van Esterik (1988: 189) states:

> 'Culture' is often blamed for generating attitudes and beliefs which are seen by development planners as obstacles which must be overcome by education. Particularly common in the literature on maternal and child health is the argument that culture restricts the consumption of certain foods and dictates the consumption of others.

According to Manderson (1990: xii), culture includes a crucial response to health and illness which varies among persons and communities. Manderson (1990: xiii) views culture as 'all aspects of human thought and behaviour', as she writes:

> Culture is patterned; it is not arbitrary. It involves ritual actions, shared understandings and expectations. Cultural roles govern the most ordinary actions, including those actions which we take for granted and which affect our health: how we eat, eliminate, rest, and recreate...We are all of and within culture.

According to the assumptions of the medical approach, the provision of health services should at best eliminate certain diseases, but the example of the persisting high infant and child mortality rates due to malnutrition and infectious diseases in developing countries highlights the complexities of causes of disease. Even when economic factors are taken into account, disparities in health levels still exist among societies with similar levels of health provision and comparable economic levels. It is believed that all societies have their own ideas about health, which they have developed and that to some extent reflect the way people live and

their socio-cultural conditions, and these ideas are believed to be a major determinant of health and disease (Rivers, 1924 cited in Wellin, 1977: 49-50; Ackerknecht, 1942 cited in Wellin, 1977: 51-52; Carr-Saunders, 1964: 75; Coale, 1973).

The concern with culture in the study of health and health behaviour is evident in the work of anthropologists in particular which has the character of a 'multidisciplinary approach', broadening the scope for explaining disease occurrence and health behaviour. However, the early anthropologists' work was restricted to the primitive medical system; for example, Rivers' (1924, cited in Wellin, 1977: 49) attempts to show that disease is a universal part of the human condition and that human groups, even primitive communities, have their own systems of belief and perception for recognising disease and methods of coping with health problems. However, Rivers' concern is very much with the basic rather than the applied nature of health and health behaviour. Later anthropologists became more involved in the applied issues of health and international health, and their interests shifted toward studying the implications of culture for health actions in public health programs. Instead of merely dealing with factors that influence people's beliefs about health and illness, which in turn shape their medical systems, anthropologists began to look into the issues related to the manner in which different societies perceived and responded to new health interventions brought to them from foreign cultures (Coreil, 1990: 5). They also became more concerned with the way health-change agents viewed and reacted to the host community and culture that they were supposed to change, and with methods to get people to accept new health practices. Paul (1955) has been considered a very important contributor to the field of applied anthropology, particularly in dealing with the relationship between culture and health development. A remark made by Paul (1955: 1) continues to have profound influence on those involved in bringing about change in traditional medical systems:

> If you wish to help a community improve its health, you must learn to think like the people of that community. Before asking a group of people to assume new health habits, it is wise to ascertain the existing habits, how these habits are linked to one another, what functions they perform, and what they mean to those who practice them.

Foster (1973) is another leading contributor to this field. His main interests are the cultural context of health, and the interaction between western and peasant culture, primarily in Latin America. He sees the medical system as an integral part of the culture. A medical system is a sub-system in a society and it is interrelated with other sub-systems. There are three basic sub-systems primarily affecting change in health behaviour: the system of group conduct which predisposes people to think and behave in normative ways according to their perception of circumstances; the system of social relations, in which persons and groups are linked together by rights and duties, by expectations and obligations; and the system of individual cognition and behaviour, which underlies the first two systems and which is rooted in biology and life experience, and determines how the individual will react in a given situation. Foster (1973: 244-245) suggests that people will change their traditional behaviour when and if by such a change, first, they perceive personal, economic, social, psychological, health, or other advantages; second, they perceive change as a realistic possibility for them; third, the economic costs are within their abilities; and fourth, the social costs do not outweigh the perceived advantage.

Demographic determinants. Age and sex are the principal biological factors determining the state of health in both individuals and aggregates. The observed health outcomes of children in many societies exhibit a U-shaped pattern, with health beginning to deteriorate from six months of age through the second year of life (Gordon et al., 1967; Levinson, 1974; Martorell et al., 1975; Mata et al., 1975; Rao, 1980). Young children are highly susceptible to ill-health for two reasons. Firstly, they have greater nutrition requirements relative to body mass than do other age groups (FAO/WHO, 1973; Popkin et al., 1980: 3; Martorell, 1980: 83). For example, the protein requirements of a six months old infant are about two to three times higher than at 10-12 years, and about five times higher than among adults (Munro and Crim, 1980). They are also in a stage of fast growth which coincides with a period of changing diet from breastmilk to prepared foods. Some forms of nutrition deficit such as kwhashiorkor, marasmus, anaemia, and

xerophthalmia, are more prevalent in this age group, especially during the weaning period, if the children fail to meet their nutrient requirements. Secondly, the young age groups have a different biological make-up and undergo a critical transition period, and thus are more prone to infection (Gordon et al,, 1963; Martorell, 1980: 83). Their specific or non-specific immunological mechanisms are immature and antigenically inexperienced (Sahni and Chandra, 1983). Breast milk enables children to fight diseases until an age where they develop their own immunity, unless cultural constraints have blocked the process. For example, some Thai and Indonesian mothers believe that the yellow milk or 'colostrum' is thick and impure, and does harm to the child's health (van Esterik, 1988: 197). Age is often found to be a determinant of food distribution. In some societies, age differences are consciously marked by serving size or order; in others, children are allowed to eat anything or not allowed to eat adult foods (van Esterik, 1985: 108). However, little is known about how the food distributor views age differences.

Regarding sex differentials in health and nutrition, various studies show evidence of differential malnutrition between males and females. For example, Chen et al. (1981) investigate sex bias in the allocation of food within the family in Matlab thana, Bangladesh. They point out that girls show nutrition deficits in weight-for-age three times higher than boys, and that female mortality rates exceed those of males at all ages. In contrast, studies in the Philippines (Adair et al., 1991: 193) and Nigeria (Chojnacka and Adegbola, 1984: 803) revealed that boys suffered more from diarrhoeal diseases and other infections than girls. By contrast, sex differences in nutritional status of children in most Latin American countries are not common (Mata, 1978: 299; Martorell and Habicht, 1986: 246). Safilios-Rothschild (1980: 322) argues that sex is more important than age in determining the distribution of resources within a household, particularly among low-income earners. The relationship becomes clearer when age and sex are combined as a determinant of infant nutrition. This differential is thought to be based on the perceived value of sons and daughters in a society. If sons are expected to earn income and send

money home, or dowry and bride price are significant, this may influence the value of children (Safilios-Rothschild, 1980: 338; Rogers, 1983: 19). In some societies, for example in Southeast Asian countries, both sons and daughters provide a major source of old-age security (Jones, 1990: 7), thus sex preference could be marginal. In such circumstances, biological make-up could play a prominent role with boys at a biological disadvantage. Chojnacka and Adegbola (1984: 803) suggest that sex differences in morbidity can be improved by means of provision of health services.

Socio-economic determinants. Many studies in both affluent and poor societies have investigated the link between socio-economic variables and the growth and development of children. The results have almost always confirmed that children living under favourable socio-economic conditions are taller, heavier, better developed and have lower rates of morbidity and mortality than those living under less favourable conditions, regardless of the socio-economic measures used (Douglas and Blomfield, 1967; Rona, 1981: 267; Chutikul, 1983; United Nations, 1990: 4-7). Malnutrition is an example of poor health which has been linked to multiple causes. A deficient diet may be an immediate cause, but it is part of the total picture which as well as causing malnutrition also culminates in illiteracy, low purchasing power, and inadequate health care facilities (Cravioto et al., 1966: 333; Precy and Payne, 1980; Unakul, 1985).

A multivariate analysis of factors affecting malnutrition was carried out in rural areas of the Punjab in northern India. It was found that age and sex of children, income of parents, morbidity status, and reported caloric intake were the major predictors of nutritional status, and that the health intervention and nutrition beliefs of the mothers of those children contributed to the prediction of caloric intake (Levinson, 1974: 62). An analysis of social and cultural factors in relation to the nutritional status of Jamaican infants was carried out, the significant variables being a nuclear-family solidarity factor, caretaker-maturity, and dependency-ratio factors (Marchione, 1980: 256). The study in the Guatemalan highlands by Mata (1978: 304-318) confirmed the close link between social and economic variables and

undernutrition in children. The strong influence of economic factors and high fertility were also found to be the major cause of malnutrition among children under five in Northeast Thailand (Chutikul, 1982; Konjing and Veerakitpanich, 1985).

Environmental exposure. Environmental exposure is a critical factor in infections, mainly through the means of personal hygiene, excreta disposal facilities, methods for preparing and storing foods, and water supplies. Although the literature on the impact of environmental sanitation and water supplies on some infectious diseases such as diarrhoea is not univocal, attention has widely been given to improving the basic living conditions (Feachem et al., 1983; Esrey et al., 1985). Hygiene interventions in developing countries are argued to be either ineffective, unfeasible, inappropriate, costly (WHO, 1979; Feachem et al., 1983), or to fail to comprehend the complexity of the problem of poverty (Feachem, 1986). Poverty means lack of resources and also that the capacity of individuals to change their behaviour is limited. It is, therefore, not surprising that an improved water supply has little health impact in many societies. Walsh and Warren (1979) suggest that substantial reduction in diarrhoeal diseases can be made only by providing piped water into the home; water through public stand-pipes would have a very limited effect on the reduction of such disease. Torun (1983) has argued that improvements in water supplies and sanitation facilities without a strong educational effort have a limited impact on health. This is consonant with findings in many developing countries such as Bangladesh (Ahmed et al., 1993), Malaysia (Habicht et al., 1988), the Philippines (van Derslice et al., 1994), and Thailand (Pongpaew et al., 1990).

Health interventions. Although the infection-malnutrition syndrome in most developing countries is profoundly linked with poverty, the provision of health services is essential, but is not the only means to improve the health status of the population. Health efforts can at least prevent and treat the poverty-related factors that generate under-nutrition infection and parasitic infestation and subsequently improve general health (Gallagher, 1984). However, the efforts that have been made in most developing countries regarding health development amount to the

'trickle down' approach. The development is directed towards establishing costly and sophisticated medical systems similar to those in developed countries. These services, therefore, are unlikely to serve the health needs of those living in rural areas (Bryant, 1970; Mosley, 1985: 103; ESCAP, 1987: 8). Morley (1973: 19-23) argues that the developing countries should shift health service alternatives from costly and sophisticated medical technology to expansion and improvement of rural health services; health facilities must be built in accordance with people's needs and not with the demands of advancing modern medical techniques. This argument takes the health centres as the focus for providing available health services at a cost people can afford and at a place to which people have access.

The reduction of infant and child mortality and an increase in life expectancy in developed countries is, to a large extent, attributable to enormous improvements in public health and the widespread application of the classic public health technologies such as water supply, sanitation, personal hygiene, food supplements, and immunisation. The advanced medical technologies, however, which were established in the early part of this century were believed to have only a marginal effect on the improvement of the health of the population in industrialised societies (McKeown, 1976; Vallin and Lopez, 1985: 4; Ramalingaswami, 1986: 1181). Public health interventions have recently been implemented in various developing countries, notably Costa Rica, Sri Lanka, Kerala state in India, and China. Undoubtedly, they have played a key role in reducing infant and child mortality (Feachem, 1985). However, Nations (1985: 164) states that the success depends greatly on an ability to conform to people's life styles and to avoid confrontation with the existing health attitudes, beliefs, and behaviours.

1.4 Factors affecting health services utilisation

The study of health services utilisation has been conducted within a wide range of disciplines. However, the findings have not been consistent either in direction or in strength, with few attempts to reconcile results or to account for apparent disparities (McKinlay, 1972: 115). Each discipline has its own standpoint and focuses on

different aspects. For instance, the main concern of the economic approach is to study financial resources as a major determinant of the use made of health services (Alpert et al., 1967; Roth, 1975: 214), while the socio-demographic approach places emphasis on explaining the characteristics of the users and non-users. According to the socio-cultural approach, however, the use of health services varies according to 'social class' (Rodman, 1959; Gans, 1962) and 'social network' (McKinlay, 1972: 115). The system interacting explanatory variables for the use of health services in developing countries seems to be more complex than in developed countries because such factors as concepts of illness, health behaviour, a wide range of health services, socio-economic conditions, and social network are operating (Kroeger, 1983: 148). This review will not seek to distinguish the nature of the above approaches, but rather to highlight some works which are relevant to the present study in four main categories: demographic, socio-economic, perception of illness, and access to health services.

The demographic variables age and sex are primary variables related to use of health services, partly because morbidity is directly related to them as inherent parts of the biology and life cycle of human beings (Anderson, 1963: 352). The demographic profile of a given population influences the nature of the health system. On the other hand, the health system influences the demographic profile through its impact on health status (Pol and Thomas, 1992: 23). Given morbidity patterns of a population, two broad age groups (young children and the elderly) are expected to heavily use health care services; infectious diseases are prevalent among young children, while non-communicable and chronic diseases are the major health threats in the elderly (Aday and Eichorn, 1972: 17; Sonnenschein, 1979: 158). Type of health care use is also determined by age; for example, in Punjab (Kakar, 1977), Taiwan (Kleiman, 1980) and Nigeria (Maclean, 1965), the elderly are the most likely to visit traditional practitioners.

Sex-specific health service utilisation is to be expected particularly in societies where sex roles are clearly defined, such as in Islamic societies (Kroeger,

1983: 148). Several studies found that the level of use of health resources is much lower for men than for women and increases with age (Anderson, 1963; Blackwell, 1963). Use of health resources also increase with the use of preventive care and gynaecological and obstetrical services (Hulka and Wheat, 1985: 447; van Wijk et al., 1992: 676), and with increased awareness of ill health (Tomari et al., 1990: 23). A study of the use of hospital and clinic facilities in a Thai community by Goldsen and Ralis (1957: 31) indicated that even though institutional care of the sick was positively related to age and sex, the relationship was not significant. Although several investigations reveal clear age and sex differences in use of health services, the findings do not explain why variations exist. Some researchers, for example, Bharwaj (1975), Kapur (1979), and Heggenhougen (1980), have claimed that three variables: age, education, and income are not indicative of preferences for medical care, especially among people who seek psychiatric help.

The importance of family size in use of health care services is not clear. The number of children may act as a barrier to the use of health services (Warren et al., 1987: 237; Auer and Tanner, 1990: 1269). On the other hand, large families provide social support including child care substitutes which may enable mothers with young children to use health services. Seo (1976) conducted a study in rural Korea which found that, among rural families, the size of family, next to education and religion, played a significant role in governing the use of health services.

Education, particularly women's education, is one of the most powerful factor influencing utilisation of health services. Cleland (1989) discusses various possible links of maternal education-child survival, drawn from micro-level studies, including changes in knowledge and beliefs, valuation of children, the nature of the mother-child relationship, and instrumentality, social identification and confidence. McClain (1977) focusses on cognitive and behavioural changes and points out that education has a pronounced effect on health-related behaviour, but marginal effect on health knowledge and beliefs. Thus educated women are more likely than the uneducated to use modern health facilities and adopt modern health practices. He

explains that experience of schooling may enhance women's ability to manipulate the outside world, change their 'social identification', and improve their confidence in dealing with others as well as government bureaucracies. Caldwell (1986), among others, has argued that education gives women the power and confidence to take decision-making into their own hands and gives a greater capability in manipulating the world, leading to greater use of health services.

Social networks are also found to be one of the decisive factors in shaping people's choices of health providers; relatives and friends are consulted first in an individual case of illness (Kroeger, 1983: 148). Kleinman's (1980) description of the patient-family-practitioner relationship in Taiwan may serve as an example of the importance of social bonds in utilisation patterns.

Several studies have emphasised the importance of people's perception of the duration, severity, and cause of illness, and have concluded that the more chronic the condition, the more time the complainant has to resort to different curing facilities, and that chronic illnesses are usually treated by traditional healers (Kroeger, 1983: 150). In Taiwan, for example, 90 per cent of patients of traditional healers suffered from chronic and psychological disorders. In contrast, children's diseases are often labelled acute medical problems and consequently treated by modern practitioners (Kleinman, 1980). Chronicity may also influence multiple use of health care facilities if the persistence of illness represents the ineffectiveness of cures (Heggenhougen, 1980). A sick individual, especially with a chronic illness, moves from one system to another with very little difficulty (Chen, 1979). The persistence of problems after being treated by physicians may make the patients go further for reputable traditional healers, even though they have high educational and socio-economic status (Lieban, 1981).

Although the term 'access' has long been a central concept to much of the research on health policy and health services, it has not been defined or measured precisely (Penchansky and Thomas, 1981: 127). Aday and Anderson (1974: 208-9) point out that access has been more a political than operational idea, so that it is

difficult to measure. It has been taken as synonymous with such terms as 'accessible' and 'available'. Access can be defined as the relationship between the location of resources and the location of users. Thus access measures how well an existing distribution of health facilities serves the population. Accessibility and access are measures of potential utiliser and provider contact, while utilisation measures actual contact (Penchansky and Thomas, 1981: 128).

The distance from a user to a provider has always been recognised as a barrier to use of health services, as distances affect both time and money costs of travel. Shanon and colleagues (1969: 35-6) argued that the functional rather than the physical measures of distance are more sensitive to the effort involved in travelling to the health resources. Donabedian (1973) states: 'The proof of access is in use of service, not simply the presence of the facilities'. He thus suggests the quantity of use should be taken as the dependent variable of interest. Although several studies have demonstrated the impact of distance on the use of health care facilities, the utilisation seems to vary with the different socio-economic, attitudinal, and other functional measures. A study on health seeking behaviour in rural India (Nichter, 1978), for instance, has shown the interplay of distance, the patient's financial capacity, perception of illness aetiology, and severity. A modern practitioner who is located nearby may be consulted first. If the patient has not yet recovered, other sources of care will be sought, in keeping with the patient's financial capacity as well as his or her evaluation of the aetiology of the illness. Basu (1990: 280) argued the effect of access to health services weakened when controlled for availability of health services.

1.5 Organisation of the study

The present introductory chapter has included a brief background to the study, its objectives, and a conceptual model followed by a review of the salient literature dealing with key areas covered by the thesis. Chapter Two presents sources of data and a discussion of methods of analysis. Chapter Three provides background to the Northeast and a profile of the case study village. Chapter Four describes the health

status and health care delivery system in Thailand in the past and at present. It also describes the utilisation of the existing services, and health care services in the case study village. Chapter Five begins the discussion of the extent and nature of utilisation of maternal and child health services using the TDHS data, followed by evidence from the case study village. Chapter Six discusses the patterns of nutritional status and health of children and ever-married women. Chapter Seven continues to discuss correlates of child malnutrition. Chapter Eight focuses on correlates of prevalence of diarrhoea among children under five years of age. This study closes with a chapter summarising and detailing the conclusions and implications of the study and suggestions for further research.

CHAPTER TWO

Data sources and methods of analysis

The development of the conceptual framework for the study of child health and utilisation of health services requires rich data which capture both the patterns of health status and utilisation, and determinants, as discussed in Chapter One. This chapter begins by describing two sources of data used in this study: the TDHS and the field research. Section 2.2 outlines the limitations of the TDHS data. Section 2.3 describes the statistical methods used for the analysis of the data, while health and nutrition perspectives are included in Section 2.4. Section 2.5 explains the conceptual framework of the study. The definitions and labels of variables used are included in Section 2.6.

2.1 Data sources

In order to explain health behaviour and health status in a rural setting, a combination of quantitative and qualitative approaches has been employed. The data are drawn from two main sources, the 1987 Thailand Demographic and Health Survey (TDHS) and a field research study conducted in 1992. The lapse of time between the two data sources may have produced some change in the health status and utilisation of health services, due to improvement in socio-economic and environmental conditions. However, it is assumed that beliefs and practices related to health are unlikely to change within that period. The study was confined to an examination of the situation in the Northeast.

2.1.1 The Thailand Demographic and Health Survey (TDHS)

The TDHS survey was a national sample design which allows independent estimates for the four major regions and Bangkok as well as urban and rural domains. The survey sample of 6,775 ever-married women aged 15-49 was conducted between March and June (hot season and the beginning of wet season)

1987 by the Institute of Population Studies, Chulalongkorn University in collaboration with the Institute for Resource Development (IRD)/Westinghouse, USA (Chayovan, et al., 1987: 129). Altogether this sample of women had 3,520 children aged under five on whom information was obtained. The present study is based on a sub-sample of all women in the Northeast with children aged 0-59 months, a total of 735 children. The total number of children in the study, however, varies depending upon what aspects of health and health related behaviours are to be explored. For instance, in analysing correlates of child health in terms of nutritional status, 388 children aged 6-36 months whose anthropometric measurements were available are used. For the analysis of prevalence of diarrhoea, on the other hand, all children aged 0-59 months were included.

The data obtained from the TDHS are quantitative in nature. They include household profiles, information on women's reproductive behaviour, which covers contraception and breastfeeding, as well as data on child health and anthropometric measurements of both children and women. For the purpose of this study the data have been classified into dependent and independent variables. As the major dependent variable, the health status of children was represented in terms of nutritional status and the prevalence of diarrhoeal disease in the 24 hours and two weeks prior to the survey. Since the TDHS data are cross-sectional in nature, it is not appropriate to examine the relationship of nutritional status of children and prevalence of diarrhoea. These two dependent variables were therefore analysed separately. The independent variables consisted of socio-economic and demographic characteristics of both households and individuals, household sanitation, maternal anthropometric measurements, accessibility and availability of health services and the utilisation of such services. Analytical methods used for these data are described in Section 2.3.

2.1.2 The field research

The field research was carried out in a rural village in the Northeast region between February and July 1992 (for details see Chapter Three, Section 3.3). The

village, Ban Tha (pseudonym), was chosen with the intention of investigating in more depth some of the beliefs and practices which influence the patterns of nutrition and health prevailing in rural areas of the Northeast. It was chosen as a normal village; as far as the village was chosen at the time, it did not have unusual factors that would have differentiated it from other villages in the region. However, it did have a health centre in the village, which meant that villagers had better access to health facilities than in the majority of the Northeastern villages. This choice was intention, because one need of the study was to investigate degrees of utilisation of local health services when distance was not a barrier.

A household survey, focus group discussions, participant observation and in-depth interviews were the methods used for data collection. All households with ever-married women aged 15-49 were identified using recent household lists, and a list of women of reproductive age from the health centre was also used to make sure that no households were left out. Sixty-seven households were met the criteria. All 69 women with children aged under five from the listed households were then interviewed. In the case of children whose mothers were not at home at the time of survey, other adult family members, particularly grandmothers, were interviewed. The questionnaires used for the household survey replicated the TDHS questions which were relevant to the study; however, additional questions especially on feeding practices, child care and rearing, the process of health seeking behaviour, health care decision making and attitudes towards health services were also asked (for details see Appendix A). The household survey was intended to provide a basic set of information for selecting participants for the in-depth studies and to enable possible comparisons to be made with the TDHS.

Four sessions of focus group discussion were conducted to gain insights into the nature and patterns of health and health related behaviour together with the utilisation of maternal and child health care alternatives. Two groups of women with young children (7-8 women in each group), a group of seven grandmothers, and a group from the general population (four women and three men) were

conducted. These participants were selected from the survey households on the basis of their convenience and the presence during the field research. Participant observations and in-depth interviews were performed among 15 households and in the health centre during a three-month period in the village. These households comprised one pregnant woman, two postpartum mothers, nine children under five and one traditional midwife. Two of the households were village stores. The guide-lines for interviewing used as a tool for the study are shown in Appendix B.

2.2 The TDHS data limitations

The major concern of the TDHS survey was to collect a wide range of information concerning the demographic and health status of the survey population. The data were collected by a research team. However, a number of limitations in these data must be considered. Four crucial limitations are particularly relevant to this study.

Firstly, the TDHS is a nationally representative survey providing data on fertility, family planning, and maternal and child health to facilitate national planning, policy making and research on population and health. By contrast, the present study focuses on utilisation of maternal and child health services and child health among children aged 0-59 months in the Northeast region only. The number of cases that meet the criteria for this study was rather small. This limitation might have an effect on the analysis; in particular, the small number of cases will limit the statistical methods to be used. In addition, since all children aged 6-36 months were included in the analysis of nutritional status and those aged 0-59 months in the analysis of diarrhoeal diseases, some characteristics of women and their husbands may be duplicated if they had more than one child. However, the numbers of children who fall in such groups may be quite small, and thus will not have a significant effect on variables under study.

Secondly, the most crucial demographic variable in this, as in many studies, is age. Most studies indicate that Thai women tend to state their age at their next birthday as their current age. The TDHS age data on women and children were

obtained in response to the question 'How old are you?' In addition, respondents were asked whether it was possible to obtain the date of birth from a household register card or birth certificate. Only slightly more than half of the children's ages were reported from a birth certificate. Although birth date, including time of birth, is considered to be important for villagers in the Northeast in order that this information is used to estimate the age at some important events in the life cycle such as age at ordination for men and marriage (Centre for Isan Monks, 1990: 3), the accuracy of the reported birthdate and age relies on the respondents' memories.

Thirdly, the measurements of body weight and height of the children are usually prone to measurement error, particularly in young infants (Bailey, 1993: 10), as a result of errors made by field workers on errors in the instruments. Field workers for the TDHS were given extensive training, and each fieldworker's measurements were standardised with those of the supervisor (Chayovan et al., 1988: 111). Height measuring boards with a fixed headboard and a movable footboard were used to measure the recumbent length of children, who were also weighed wearing minimum clothing on a portable and durable lightweight hanging scale. Children under one year old were put in an infant's basket and those one year or older were held by weighing pants when weighing (Suntikitrungruang and Nokyoongthong, 1989: 60). Although these anthropometric data allow an examination of a wide range of nutritional status indicators, since the data are cross-sectional, this does not take into account seasonal variations in malnutrition which are pronounced in the Northeast (Kotchabhakdi et al., 1987; Pongpaew et al., 1990).

Fourthly, the morbidity data on the occurrence of diarrhoea were obtained retrospectively. The data were reported by the mothers of the children, and recorded by a non-medical person. Even with a short recall period of 24 hours and two weeks, and extensive training of interviewers, the chances of under-reporting or mis-reporting cannot be discounted. Over-reporting, on the other hand, is unlikely, so that measures have an inherent negative bias. Apart from memory lapse,

perceptions about and attitudes toward disease influence reporting of the occurrence of disease. For example, if people perceive a certain disease to be a common or minor ailment, when the disease occurs, it may not be considered as an incidence of disease (Wadsworth et al., 1971: 93).

The study is an example of perception of infant diarrhoea in rural Northeast Thailand. Thongkrajai et al. (1990: 774) indicated distinct differences in the definitions and terms used for diarrhoea according to a number of criteria. The conventional term *thongsia* was used only if frequent loose stools occurred in adults or children. Among infants or children under one year of age, the same symptoms were called *sou*. Most mothers believed that *sou* was normal for infants, who are believed to pass frequent stools with changing stages in body growth and development. The TDHS, however, used the conventional term *thongsia*, although sometimes, but not always, the local term for diarrhoea (which differs among regions), was used. When the conventional term *thongsia* was used, information on *sou* would not have been obtained, and consequently the morbidity rate may have been grossly under-reported.

The extent of under-reporting due to memory error or intentional and unintentional failure to mention disease may not have been uniform among the mothers of different socio-economic groups, and as such can pose a serious limitation in studying morbidity differentials. In obtaining morbidity data an attempt was made by the TDHS to reduce field staff biases through extensive training. A field check of questionnaires was also made by supervisors (Chayovan et al., 1988: 111).

The overall data quality is discussed in the TDHS 1987 report (Chayovan et al., 1988: 157-165). The errors which might occur during the field survey (non-sampling errors) are difficult to avoid but these problems were handled carefully during the design and implementation of the survey, thus minimising these problems as far as possible. The sampling errors were evaluated statistically and measured by means of the standard error of some selected variables. The conclusion of the

examination of the measures is that the data for the country as a whole were reliable, as the sampling errors for selected variables were small. Similar results are also found for the Northeast region (Chayovan et al., 1988: 159).

2.3 Methods of analysis

The TDHS data were analysed using two approaches. First, the bivariate analysis examined the relationship between dependent and explanatory variables. In accordance with the purposes of this study two indices of nutritional status, one index of morbidity of diarrhoea and four indices of utilisation of maternal and child health services were used. The nutritional status of children aged 6-36 months was examined in terms of prevalence or the percentage of undernourishment, defined as having height-for-age or weight-for-age z-scores two standard deviations below the WHO-NCHS reference standard. The morbidity from diarrhoea was determined as prevalence or the percentage of children aged 0-59 months who experienced diarrhoea during the two weeks prior to the survey. The utilisation of maternal and child health services or preventive health measures examined in this study included type of prenatal care, tetanus toxoid injection, type of attendant at child birth, and ownership of health record card (for detail see Chapter Five). This level of analysis simply examined the relationship between two variables without taking others into account. Thus, it did not identify the strength or nature of that relationship because these variables interact with each other in a more complex way. Since this study attempts to assess the complex relationship of several sets of independent variables on the dependent variables, an appropriate multivariate analysis must be employed.

Multivariate analysis using logistic regression was carried out to investigate variation in risk of undernourishment and children's diarrhoea. Logistic regression is appropriate to the present study since it seeks to assess the effects of a set of independent or predictor variables on dichotomous response or dependent variables. According to Feinberg (1989: 97), when one is interested in models that assess the effects of categorical variables on dichotomous response variables, then an analysis

based on logits for the response variable is appropriate. In accordance with the objectives of the study, the dependent variables were treated as dichotomous. For the analysis of the undernourished children, the dependent variable was equal to 1 if the child's z-score was -2 standard deviation units or below or under-nourished and equal to 0 if a z-score falls above -2 SD or well nourished. Likewise, morbidity of diarrhoea was equal to 1 if the child was reported as having diarrhoea during the two weeks preceding the survey and 0 otherwise.

The logistic regression models were used for describing the nature of the relationship between dependent and one or more explanatory or predictor variables. They were also used for making predictions. However, the models required several independent variables to obtain adequate descriptions and useful predictions. In multiple linear regression, the mean value of the dependent variable is expressed as a linear function of a set of explanatory variables. The regression coefficient (b) measures the effect of a unit change in the explanatory variable (x) and this effect is the same for all values of x. However, in the case where the dependent variable is dichotomous, the relationship between probability of success (Pr(Y=1)) and a set of predictor variables would not usually be linear since a straight-line relationship would imply probabilities outside the legitimate range of 0 to 1 for some values of the predictor variables. In order to fit the relationship into the framework of linear regression it is necessary to apply a transformation. This leads to the methods of logistic regression (Goodman, 1978: 27; Armitage and Berry, 1987: 387; Healy, 1988: 81). The multiple logistic regression model fitted to the data for this study is expressed as follows:

$$\ln (p/1-p) = b_0 + b_1(x_1) + b_2(x_2) + \ldots + b_k(x_k)$$

where:

p is the probability that the dependent variable is equal to 1 (under-nourished children and children who experienced diarrhoea during the two weeks prior to the survey).

$b_0 \ldots b_k$ are functions describing the main effects of independent variables $x_1 \ldots x_k$ on log of odds p/1-p (maximum likelihood estimates).

$x_1 \ldots x_k$ refer to explanatory variables.

The model illustrated above assumes that the relationship between independent variables and dependent variables is additive. That is, the relative risk of an event occurring cannot be predicted perfectly solely on the basis of each of the independent variables, because all information about the variables is included in the model (Goodman, 1978: 40). Moreover, in certain circumstances some of the independent variables may also influence the dependent variable interactively. The logistic regression model which takes into account an interaction term can be expressed as follows:

$$\ln(p/1-p)=b_0 + b_1(x_1) + b_2(x_2) +...+b_kx_k+ b_{12}(x_1x_2) +...+ b_{k-1,k}(x_{k-1},x_k)$$

where:

$b_{12} \ldots b_{k-1,k}$ denote functions of the interaction effects between $x_1x_2 \ldots x_{k-1},x_k$

However, the main purpose of the study is to identify an optimal model which provides the explanation of the observed relationships between the explanatory variables and childhood malnutrition and diarrhoea and utilisation of health services in the Northeast. Considering that the interpretations of the interaction effects are considered to be very complicated and sometimes unimportant in practice (Trussell and Hammerslough, 1983: 10-11), this study is confined to defining a simple or main effect model.

The logistic regression model is estimated using the interactive statistical modelling package, Generalised Linear Interactive Model (GLIM) developed by the Royal Statistical Society of London (Aitkin et al., 1989). The GLIM program can fit models only with a single dependent variable, y and a set of independent or predictor variables, $x_1 \ldots x_k$, which are assumed to be measured without error and recorded without missing values (Aitkin et al., 1989: 68). GLIM uses the method of iterative proportional fitting to obtain maximum likelihood estimates of the predictor variables. This method depends solely on the model having a sufficient configuration so that no special provision need be made for sporadic cells with no observations (Bishop et al., 1975: 83). Results obtained from GLIM are regression

coefficient, scaled deviance (or likelihood ratio chi-square), degree of freedom and their standard errors.

The logit maximum likelihood estimates can be transformed into odds ratios allowing expanded interpretation. The odds ratios risk of likelihood were obtained by applying an exponential to the parameter estimates. The parameter estimates provided for a given variable by the logistic regression are with respect to each category of the variable with the first category usually treated as the baseline or reference category. Thus the odds ratio for the base category is equal to 1.0 which shows the relative level of likelihood of the event occurring for each category of a variable compared to the reference category. If an odds ratio is greater than 1.0 this indicates an increased likelihood of the event occurring, while an odds ratio less than 1.0 indicates a decreased likelihood of its occurring.

The model was selected using a forward entry method by comparing the value of scaled deviance and degree of freedom in successive hierarchical methods. Variables describing socio-economic and demographic variables and accessibility to health services were first fitted into the models in order of the level of significance followed by utilisation of health services and water supply and sanitation. Two controlled variables (age of child and place of residence) were included in all models. The t-statistic was then used for testing whether the predictor variable, x_k, has an effect on the dependent variable, y. The t-statistic was obtained by dividing parameter estimates by respective standard errors. The confidence interval employed in this study was plus and minus 1.96 standard errors, that is the 95 per cent level of confidence.

The regression models obtained from the above methods are parsimonious; that is, only variables found significant are retained in the model. When all significant variables are allocated in the model and cross-tabulated, the observed cell counts are small and even leave some empty cells. A variable should be disregarded in the analysis if it has low explanatory power, in order to remove the arbitrary effect of sample size. (In a large sample, more variables can be statistically significant

though their explanatory power is weak). In order to detect the impact of small observed counts in the baseline category, population attributable risks (PAR) are estimated. PAR values can be derived by calculating the ratio of the proportion experiencing the successive baseline event to that of the event described in the immediately preceding baseline category. The critical values are set at 0.95 to 1.05. If the PAR falls within this range, addition of the new variable does not increase the explanatory power of the model by a large amount. Thus the variable is discarded (Gray, 1992, personal communication). According to Hobcraft (1991: 1159), the PAR can be interpreted in terms of excess population-level risks, if the PAR differs from 100 per cent by more than ten percentage points, the variable is considered to be significantly associated with clear major potential gains.

2.4 Health and nutrition perspectives

2.4.1 Concepts of health

The attainment of good health is an absolute goal of individuals, families and nations. Measuring the level of a population's health is a complex conceptual problem. Perhaps the difficulty stems from the apparent multidimensionality of health and from the absence of any widely accepted standard definition of health (Sullivan, 1966; Cott, 1986: 72). Although the WHO (1957) defines health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity', health appears to be socially and culturally defined with its definitions varying according to the specific social and/or professional setting (Biraben, 1980: 387). Thus being sick in some societies may not be viewed as illness in others (Daniels, 1985). This definition also ignores the account of the problem of illness mechanisms (Biraben, 1980: 386).

In measuring health status, health may be defined in a negative or a positive way. The negative definition of health considers the state of health as an absence of illness (Peron and Strohmenger, 1985: 89). This aspect is widely accepted by health professionals as well as lay people, perhaps because it is easily defined and

measured. However, the concept of illness varies among various groups of people. For instance, health professionals distinguish the state of illness based on the presence of medical pathology, whereas for laypeople illness is feeling ill (Kosa and Robertson, 1975: 42-43). The problem arising here is whether a person who feels ill but has a negative finding for medical examination and laboratory procedures should be regarded as sick. Furthermore, because not all patients are brought to professionals for diagnoses, the problem arises as to whether the lay concept should be regarded as valid.

A positive definition of health, on the other hand, views health other than by the mere absence of illness, but as a state of physical, mental and social well-being (WHO, 1957). This definition is rather circular, since the state of well-being is difficult to verify and in essence conveys the sense of the lay definition of health. However, it is suggested that whatever definition of health is chosen, health must be presented in all physical, psychological and social dimensions (Peron and Strohmenger, 1985: 88).

The definition of health can also be distinguished according to three different views of program approaches: the medical approach, the health planning approach, and the community development approach. The medical approach views health as the absence of disease, and the absence as brought about by services based on modern science and technology, with the clients perceived as being under the direction of the medical professionals. The health planning approach views health as the result of better resource distribution and sees the community as a potential contributor through active participation. The community development approach defines health as a human condition and sees good health as a result of individual and community participation in decisions about health care, health behaviour and health development (Bolton, 1973: 3). The community development approach is currently popular in health care.

2.4.2 Nutritional status as indicator of child health

Nutritional status is one of the few positive measures of the health status of a population, especially among young children. Nutritional assessments can be made through various approaches: clinical symptoms, biochemical tests, assessment of nutrient intake and anthropometry. Usually a combination of methods is preferable. The present study is confined to an anthropometric approach using weight and height measurements which were available from the TDHS. In accordance with the purposes of the study, this section will discuss the assessment of nutritional status using weight and height measures and emphasising the choices of indicators, the reference population and cut-off point.

Choice of indices of nutritional status. In growing children, measurement of weight and height are good indices of the general state of health of both individuals and groups of children in communities where the problem of malnutrition is most severe and extensive (Preece, 1986: 17). Studies of physical growth in several societies have revealed poor growth to be a consequence of chronic illness and malnourishment (Mata, 1978: 286; Scrimshaw, 1977: 1563). Close observations on nutritional status differentials reveal that social and economic differences within societies are attributable to differences in health, and the reduction or alleviation of these differences in some societies has been held to be the result of general health improvement (Lindgren, 1976). Moreover, the growth of children is influenced by a variety of other factors such as sex, birth rank of the child, and seasonal variations.

Recently, there has been an increasing awareness of the need to monitor physical growth using anthropometric approaches to detect children with early malnutrition who require further medical attention and to screen those at risk as early as possible (Jelliffe and Gurney, 1974: 2). However, the use of anthropometry alone is more contentious (Preece, 1986: 17) since this approach is concerned primarily with the selection of measurements, methods and their standardisation,

assessment of age and in the selection of reference standards (Jelliffe and Gurney, 1974 : 5).

Weight and height (length) are often used in nutritional surveys. These measurements are meaningful when combined with age and sex of children (UNICEF, 1989: 15). Three indicators, weight-for-age, height-for-age, and weight-for-height, are commonly used to assess nutritional status of young children. They provide different interpretations of the nutritional status of individual children and population (WHO Working Group, 1986 cited in UNICEF, 1989: 16). For instance, weight-for-height is a ratio of observed weight, expected weight-for-height, and sex that reflects current under- or over-nutrition (wasting or obesity) regardless of age (Waterlow, 1976: 539). This index is believed to be sensitive to the changes in food available or disease prevalence; therefore, it is a good indicator of current acute malnutrition resulting from failure to gain weight or actual weight loss (UNICEF, 1989: 16). This index needs to be interpreted with care since it does not provide an adequate basis for assessment planning and appropriate action at the local level (Bailey, 1993: 10). In addition, the proportion of children who are considered to be wasted is often small. However, this is a useful basis for planning appropriate action and evaluating the impact of broad national programs.

Height-for-age, on the other hand, is a measure of linear growth which reflects long-term or chronic and continuing under-nutrition (stunting). Low height-for-age is normally caused by inadequate food intake and serious problems of social and economic deprivation (Waterlow, 1978: 457; 1984: 86). Moreover, height or length measurement is usually not available due to the difficulty in measurement and requires greater measuring skill compared to weight. However, the index cannot specify the onset, period and recurrence of previous episodes of malnutrition. Weight-for-age is a single composite prevalence rate which summarises under-nutrition in young children, but does not distinguish whether a child is underweight because of wasting or stunting (UNICEF, 1989: 16). Weight measurement, though widely recorded, is relatively difficult particularly in young infants and requires

careful measurement. In addition, the nutritional status of children, as measured by anthropometry, is usually described as the percentage of individuals below a specific cut-off point, such as 80 per cent of the median or the third centile or minus two standard deviations (-2 SDs) from the median (UNICEF, 1989).

Choice of the reference population. The choice of the reference population, whether to use the national or international standard, is a primary concern in studying anthropometric measurements. The NCHS standard (US National Centre for Health Statistics) is the most widely used international standard for comparison between one community and another (WHO, 1983). However, it has the following shortcomings. Firstly, physical growth is both genetically and environmentally determined. It is difficult to differentiate precisely between genetic and environmental influences. Studies in various developing countries, for example in Malaysia (McKay et al., 1971: 233), in Colombia (Habicht et al., 1974: 614), and in Thailand (Khanjanasthiti et al., 1973) revealed that young children of better-off families, who have been well fed and protected from infectious diseases, frequently have similar growth patterns to those in wealthy countries. Secondly, the NCHS can at best be used for international comparisons between one community and another (WHO, 1983). The available measurements are only approximations of nutritional status in young children (Jelliffe and Gurney, 1974: 10). Thirdly, the current desire for maximal growth, assuming that the greater the growth the healthier the child, is questionable. Recently, a growing incidence of obesity in young children has created a considerable problem of defining the commencement of over-feeding or over-nutrition, either intra-uterine or in the early days of life. In the reference population, among the changes in food patterns, cow's milk formulas are frequently given to young children, and the introduction of solid food occurs in the very early weeks of life. It is difficult to judge whether the reference standard was derived from children before or during the modern vogue for double feeding young children. The optimum or desirable reference standard would take into account not only growth in young children but also intellectual development and resistance to

infection, as well as the long-term effects, including the incidence of man-made diseases such as cardiac disease and diabetes, and it would also attempted to predict longevity (Walker and Richardson, 1973: 897).

The international WHO-NCHS reference population was chosen on the grounds that the interpretation of anthropometric measurement of nutritional status requires that values from the study population be compared to those from the healthy and well-nourished standard population. Both genetic and environmental factors influence the physical growth and development of children. There is no genetic difference in growth especially in early life up to seven years of age (Pelletier, 1991: 1077). However, some researchers believe that the genetic influence still exists in early child growth (Graham et al., 1979). Pelletier (1991: 1077) points out that the choice of the reference population depends on the purpose of the applications. The international standard is highly important for political sensitisation, but it is not necessary to use such a reference population if one is interested in other applications such as nutrition monitoring, geographic and socio-economic classification, or causal analysis. Pelletier (1991: 1079) concludes that the approach used should depend on the purpose of the study.

Choice of the cut-off point. Different cut-off points and classification systems have been proposed and used for estimating the prevalence of malnutrition in population surveys. The recommended cut-off point by WHO, which uses two standard deviation units below or above to separate the under-nourished from the well-nourished child, is among the most widely used criteria. However, some authors such as Mora (1989: 137-139), Keller (1983: 101) and Bohning and colleagues (1991: 1289) have argued that the use of the cut-off point is arbitrary and may lead to an under-estimation in the prevalence of malnutrition. This is due to the fact that there are differences in the distribution of the reference and the observed populations. For instance, the reference population is normally or almost normally distributed, while, for the observed population especially in most developing countries, the distributions are often skewed, mostly heavier to the left side.

Children who fall below the cut-off points (-2 SD) may lie outside the reference population curve. Mora (1989: 135) has proposed a new method for estimating a standardised prevalence of child malnutrition from anthropometric indicators. However, this method is not applicable for individual assessment of nutritional status.

The use of prevalence rates of malnutrition below a chosen cut-off point is preferred for policy-makers because the prevalence is easily understood and it reflects the size of the population at risk. Therefore, a policy can be directed towards those segments of the population in need of public health concern. However, this approach appears to have a number of disadvantages. Pelletier (1991: 1079) points out that a technical disadvantage is among those problems. The choice of statistical technique may be limited when estimating the prevalence of under-nutrition, especially for the weight-for-height index which has lower prevalence than weight-for-age and height-for-age. The sample size may not allow a multiple variable analysis to be carried out and that decreases the prediction values of the explanatory variables. More importantly, random measurement error in age, weight and height can produce bias in prevalence estimates. .

If the concern is with the overall distribution of the nutritional indicator, the use of mean z-scores is appropriate. On the other hand, the use of prevalence below the cut-off points is appropriate if the concern is with the difference in one tail of the distribution. Moreover, the technical problem can be overcome by applying an advanced categorical data analysis and/or multiple logistic regression. In this study, the relationship between a set of socio-economic and other factors on the identification of under-nourished children was of interest, especially in the Northeast where under-nutrition is the most prevalent.

In summary, measurements of height and weight or other specific anthropometric variables are of great value in assessing the status of a population with respect to nutrition and general overall health, especially in developing countries where malnutrition in young children is still common. Moreover, they

provide a useful tool for assessing the progress of interaction programs which improve nutrition and general health. Because the interaction of nutrition and infection is so important (Young, 1970; Martorell, 1980), the general health of the whole population is indirectly being assessed by the growth measurements.

2.5 The conceptual framework of the study

The broad conceptual framework to be used in this study is a modification of the van Norren and van Vianen model of the malnutrition-infection syndrome. This model is appropriate for a comprehensive understanding of child survival because it incorporates the theory and methods of both social and biological sciences (van Norren and van Vianen, 1986: 10). They developed the model to overcome weaknesses in the Mosley model of the determinants of child survival (van Norren and van Vianen, 1986: 7). According to Mosley (1985: 115-116), it is assumed that health-related practises at the household level affect survivorship of under fives through a set of intermediate variables which directly influence the risk of morbidity and mortality. The intermediate variables, which are biological in kind, are fifteen variables through which the social and economic resources of the child's family operate. They are grouped into five categories: maternal fertility, environmental exposure, nutrient availability, injury, and personal illness control. These intermediate variables are each affected by one of five types of health related practice at the household level, including reproductive practices, hygienic practices, feeding practices, and child care and diseases care practices. Van Norren and van Vianen (1986: 7) argued that one of the crucial shortcomings of the Mosley model is that the intermediate variables are purely biological.

According to van Norren and van Vianen (1986: 9), the intermediate variables are both behavioural and biological factors which are classified based on the GOBI-FFF and child survival package program of UNICEF and WHO. These include oral rehydration therapy, breastfeeding, immunisation, food supplements for pregnant women and children, reproductive patterns, weaning, drugs, and water supply and sanitation. Although this model is a comprehensive one for the study of

child survival in developing countries, the variables are restricted to individual and household level only. The complexity of the childhood malnutrition-infection syndrome is well recognised especially in less developed societies where health facilities are scarce and traditional life styles prevail. It is, therefore, essential to incorporate behavioural factors (utilisation) into the model.

Figure 2.1: The conceptual framework of the study (a modification of the malnutrition-infection syndrome model).

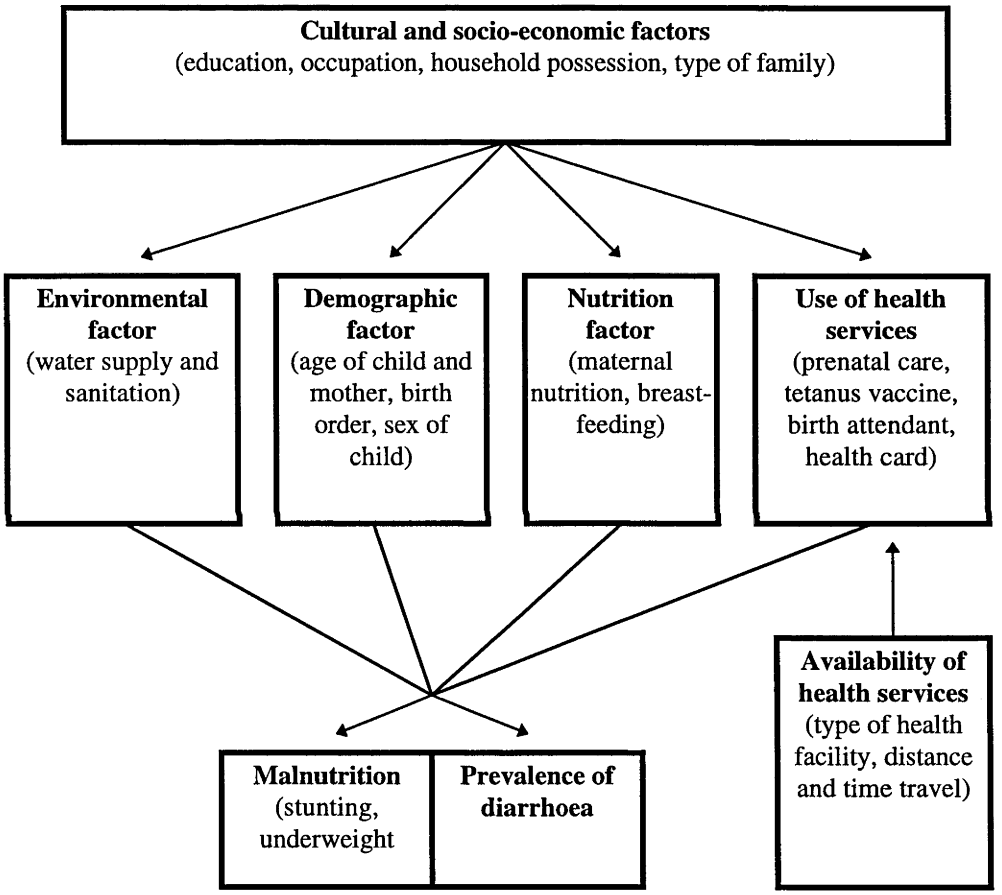


Figure 2-1 illustrates the broad conceptual model to be used in the study. The framework builds on the conceptual model of van Norren and van Vianen (1986), with modifications based on the limitations of the TDHS. It is assumed that the cultural, social and economic conditions form a major category of factors that operate through a set of intermediate variables: reproductive patterns, maternal nutrition, environmental exposure, and utilisation of health services. It is further hypothesised that all these variables directly influence the child's health (nutritional status and prevalence of diarrhoea). Availability of health services is speculated to

have a direct effect on use of health services which in turn affect the health and nutritional status of children. Because of the limitations of the cross-sectional data, the relationship between nutritional status and morbidity of the children will not be explored directly in the present study.

2.6 Variables used

The variables that are available from the TDHS data have been identified as important to the present study. These variables are defined into two broad categories: dependent and explanatory variables. The dependent variable, health status of children, is expressed in terms of nutritional status and prevalence of diarrhoea among children, whereas the explanatory variables are composed of a set of variables including demographic and socio-economic variables, household sanitation, maternal anthropometry, use of health services, and access to health facilities. These variables are defined below.

Nutritional status was based only on the physical growth (weight and height measurements) of children from the cross-sectional survey. This type of data allows us to identify the nature and extent of protein-energy malnutrition in the community (Mora, 1989: 133). Three nutritional indices were used: weight-for-height, weight-for-age, and height-for-age. Both the overall distributions and cut-off points of the indices were expressed as the standard deviation units or z-score values relative to the standard deviation median of the WHO-NCHS reference population. Choices of the indices, cut-off points, and reference population are discussed in Section 2.4.

The use of the z-scores has statistical meaning as they take into account the co-efficient of measurement variation which varies with the age of children (United Nations, 1990: 48). In the present study, after the preliminary analysis of the nutritional status data, which are continuous variables, the variables were treated as dichotomous, with two values 'well-nourished' and 'under-nourished'. In order to assess malnutrition, cut-off points need to be used to estimate the prevalence of anthropometric abnormality. The conventional cut-off point, which is applied in the

present study, is -2 standard deviation units (z-scores) from the median reference population. Only height-for-age and weight-for-age are further used in the multiple logistic analysis. Weight-for-height is left out of the multiple analysis due to the prevalence of low weight-for-height or wasting among the study population being very low (3.9 per cent). Children whose z-scores fall below -2 standard deviation units are classified as under-nourished (coded 1) and those above -2 SD as well nourished (coded 0).

Prevalence of diarrhoea. Diarrhoeal disease is one of the most common illnesses in young children in developing countries. Prevalence of diarrhoea often reflects poor environmental conditions, including social, physical and biological, in which the child lives (Black, 1984; Black et al., 1984; Tomkins and Watson, 1989; Briscoe, 1991). In this study, diarrhoea is defined as the proportion of children who experienced diarrhoea in the two weeks prior to the survey. The prevalence of a disease is thought to be an appropriate measure of the morbidity of that disease when using a cross-sectional survey in which there is no other information available, such as number of episodes and duration of disease. Black (1984) concludes from a study of childhood diarrhoea in Bangladesh that specific types of diarrhoea have a higher incidence and longer duration among children from low-income households. He points out differentials in the prevalence of diarrhoeal disease associated with socio-economic status of the household, which may reflect differences in quality of child care practises such as preparation of weaning food, feeding patterns, and access to clean water. On the other hand, the differentials may reflect the poorer nutritional status of children from low-income households, a factor known to be closely associated with more prolonged diarrhoea and other infectious diseases. On the basis of the availability of the data, reported diarrhoea morbidity is identified in terms of prevalence or the proportion of children aged 0-59 months who experienced a diarrhoea episode in the two weeks prior to the survey. This variable was coded 1 for children who experienced diarrhoea during the two weeks prior to the survey and otherwise as 0.

Demographic variables. Six variables describing demographic characteristics of children and women were examined: age of child, sex of child, age of woman, birth order, family size, and breastfeeding.

All children under five years of age were classified into five age groups: 0-5, 6-11, 12-23, 24-47, and 48-59 months. However, for the analysis of malnutrition, only three age groups were identified: 6-17, 18-23, and 24-36 months.

Age of woman was classified into three broad age groups on the basis that each group actually contained equal numbers of women: young women (15-24 years), middle age women (25-29 years), and older women (30-49 years).

Birth order is considered to be one of the factors influencing child health and utilisation of health services, which captures a woman's past experiences in child bearing and child rearing. Four categories were classified: first, second, third, and fourth or higher birth order.

Family size was also classified into four categories: one, two, three, four or more children.

Breastfeeding is recognised as an important factor directly influencing child health and nutritional status. The TDHS survey collected a wide range of information on breastfeeding, but the length of full breastfeeding and supplementary feeding was not available. The analysis was restricted to whether the children still breastfed or not.

Socio-economic variables. Four variables were identified: household possessions, co-residence with parents, place of residence, women's education, women's occupation, husbands' education, and husband's occupation.

Information on household possessions available from the TDHS, including ownership of radio, television set, refrigerator, and motorcycle were used in this study. Where there is no income information, the possession of these household items can be used as proxy for economic status of the household. Apart from representing economic status of the households, possessions of household items also

represents access to information (ownership of radio and television set) and hygienic practices (ownership of refrigerator). Thus, no attempt has been made to construct an economic index from these variables. The variables are analysed individually in both bivariate and multivariate analyses.

This study intends to examine to what extent co-residence with parents in the family influences the health of young children. In accordance with this concern three variables are identified: currently living with parents, couple's mother still alive and couple's father still alive. In Thai society, the extended family is traditional and remains in existence in most rural villages. However, recent rapid economic and social changes have brought about changing social and family structure. In urban areas in particular the emergence of the nuclear family is notable. In circumstances where family ties are strong, the influence of old people on daily life is obvious.

Education, especially of mothers, is viewed as important in health behaviour and health practises which have a great influence on the health and survival of young children (Caldwell, 1979; Schultz, 1984). Level of education is used in many studies as a measure of a woman's resources for nurturing her children. In Thailand, school attainment is relatively high. However, the majority only finish compulsory education. Taking into account only level of education as a measure of woman's resources in this circumstance may not be worthwhile. Fortunately, the TDHS survey also provides information on literacy for both women and their husbands. Therefore, in this study, education of both women and their husbands was examined. Level of education and literacy were combined to form an education indicator and classified as 'illiteracy', 'primary education and read with difficulty', 'primary education and literate', and 'secondary or higher education'.

The occupation of women and their husbands is another important variable which greatly influences the health and well-being of their offspring. It is more likely that children whose parents are engaged in better paid jobs and socially recognised jobs such as professionals, can afford to have better nutrition and health care than children of blue-collar parents. Women's work, however, may have an impact on

child health as well as utilisation of health services through lack of time for child care and feeding, particularly breast-feeding. Occupation was classified into three categories: non-agricultural work, agricultural work, and not currently working.

Environmental variables. Environmental factors have long been regarded as important factors directly and indirectly influencing child health. The analysis was restricted to the following variables: source of drinking water and ownership of latrine. The variable 'source of drinking water' is classified into three categories: pipe or tap water, rain water, and well or others. Although the TDHS collected information on type of toilet facility, there is not much variation in toilet type. Therefore, the variable 'ownership of latrine' identifies whether the household has a toilet regardless of type.

Accessibility to health service. Data on access to health and social service facilities are taken from the TDHS community questionnaire. Due to lack of information on traditional health care services, the present study focuses on the availability of modern public health services. Three variables are examined in this regard: type of the nearest public health service, distance (in kilometres) to the nearest hospital and/or health centre, and time (in minutes) taken to the nearest hospital and/or health centre. Although the TDHS community data also provide information on private health facilities such as private clinics and drugstores, these facilities are concentrated in urban areas; neither is reported as being located in the rural communities. Therefore, private health facilities were not analysed in the present study.

'Type of the nearest public health facility' is a combined variable taken from detailed information about the closest hospital and health centre to the cluster or locality. This information was only collected where the clusters were classified as rural areas, and where information was collected from key informants such as village headman, village health volunteers and leaders of women's groups. Towns where the data were not available were assumed to have a whole range of health service facilities, both public and private.

Utilisation of health service was taken as a measure of preventive health behaviour. Four measures were assessed: whether women reported receiving a tetanus toxoid injection during pregnancies leading to living children under five years of age, whether women received prenatal care during pregnancies leading to living children aged under five, type of attendant at births during the five years prior to the survey, and ownership of child immunisation or health record cards.

The TDHS collected data on pregnant women who had been given tetanus injections during the previous five years. Although the WHO states that life-long protection of tetanus injections is achieved after five doses of vaccine (WHO, 1987), the TDHS indicator based on vaccinating all pregnant women does not take into account whether they had been ever partially or fully immunised. Asking for information about injections in the last five years could have introduced a recall bias. Women may have had difficulty remembering if they had had an injection earlier, even on a birth specific basis. Moreover, the women may have confused tetanus with other kinds of injection given in that period.

The variable describing prenatal care is confined to all pregnancies which took place between 1982 and 1987, as is choice of birth attendant. These variables are classified into two categories: pregnant women who visited trained western health providers (physician or nurse/midwife), or pregnant women who visited traditionally trained practitioners, including those who did not receive modern health care services.

In analysing use of health services, the ownership of a health record or immunisation card for children is also important. In Thailand, a card is to be issued by health providers where children receive preventive health services such as immunisation and nutrition surveillance. By and large it reflects the use of preventive health care and contact with modern trained health providers. However, since the card must be kept at home and is supposed to be presented at the next service, many children, especially older children, are likely to lose their cards. Most health interventions are concentrated in the first few months of life. For example,

immunisation is scheduled at ages two, four, six, and nine months and weight measurement takes place every four to six months. These immunisation cards are kept at home and it is a parents, especially a mother's, responsibility to show them to a health worker wherever services are provided. The health workers are supposed to issue a new card to the child if the card is lost. However, in practice this may not happen and some parents may be charged for a new card. Thus, ownership of a health record card may represent under-reporting of use of preventive health services. The present study investigates the relationship between health outcomes and utilisation of preventive health services; therefore, the variable 'ownership of a health record card' is expressed in terms of a child reported as ever having a card (regardless of whether a card could be presented to the interviewer or not) or not having a card at all.

The immunisation of children against the six immunisable diseases, tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles, should be completed in accordance with a fixed schedule and doses. For example, a child should be given vaccine against tuberculosis (BCG) at age 0-1 month and only one dose of vaccination is required. In order to construct an index of immunisation, details such as information on age of children, type of immunisation and date of immunisation are needed. Although these data can be obtained from the TDHS, the percentage of children able to present documents on such details such as health card was relatively small (24 per cent out of 682 children aged 0-59 months had health cards). The immunisation status of children was examined in terms of whether children were given at least one immunisation regardless of type, or whether they were never given any immunisation at all. However, due to the small number of cases, immunisation status will not be used to examine the health outcomes.

Maternal anthropometric measurements, both weight and height, were collected in the TDHS survey. The data were used to assess the nutritional status of women, expressed in terms of both their present and past nutritional status. Height in centimetres represents the past nutritional status of women. In the bivariate analysis, height was treated as a categorical variable. Thus, the cut-off points were

assigned to stratify height into four categories based on the distribution of the population in each category: less than 150.0, 150.0-154.9, 155.0-159.9, and 160.0 centimetres or taller. Height of women is treated as a continuous variable when running the multiple logistic analyses. Weight was used to assess the composition of a body. Like height, weight was treated as a categorical variable in the bivariate analysis and a continuous variable in the multiple analysis. Weight was classified into four categories: less than 45.0, 45.0-49.9, 50.0-54.9, and 55.0 kilograms or heavier. The current nutritional status for women was expressed in terms of the body mass index or obesity. The index is obtained from women's weight in kilograms divided by the corresponding height in square metres (kg/m^2). Based on the WHO recommended cut-off points as reported in Jelliffe (1966), the standard for body mass index of adult women can be classified of woman adult into four groups of nutritional status: undernourished (0-18.6 kg/m^2), normal nutrition (18.7-23.8 kg/m^2), overweight (23.9-28.5 kg/m^2), and obese (greater than 28.6 kg/m^2). However, obesity is rather rare among Thai adults. Therefore, three categories of body mass index are used in the study. That is, under-nourished, normal, and over-nourished (overweight and obese).

In summary, this chapter has discussed the source of data used in the study and methods of analysis. Two sources of data were chosen to use in this thesis: the TDHS, and field research from a case study village in the Northeast. The definition and measurement of all the variables were also included. It is anticipated that several sets of variables including socio-economic, demographic and environmental conditions, maternal anthropometry, availability of health services, and utilisation of health services were among many to influence the health status of children. These variables were drawn from the TDHS data, while the information on cultural beliefs and practices was mainly obtained from the field research. Two approaches were used to enable the researcher to understand the complexity of health and health behaviour in the Northeast Thailand. The Northeast and the case study village will be described in Chapter Three.

CHAPTER THREE

Background to the Northeast and profile of the case study village

> A rice barn in each family stored sufficient rice for household use throughout the year. Vegetables such as chilli, egg plant, galanga, and lemon grass are grown in home gardens. A variety of fruits such as banana, sugar-cane, beans, nuts, and coconut are grown in gardens right outside each village. Water buffaloes and cattle browse on grass in the rice fields. Nothing needs to be bought except for some metal instruments such as spades, hoes, and knives. Neither the rich (holding cash more than 200 *baht*) nor the poor are to be found in these villages. Slavery does not exist. Wealth and food are equally distributed. (translated from Nartsupha, 1984: 110-111, describing the findings of a royal visitor in 1906)

After three decades of national development plans, the living standards and health of the population in the Northeast have improved only marginally. Political and economic factors, combined with an unfavourable climate, poor soil and water conditions, and physical and cultural isolation play a significant role in impeding development in the Northeast (Gohlert, 1991; Rambo, 1991).

This study of child health and utilisation of maternal and child health services concentrates on the Northeast region where malnutrition and infectious diseases among young children are prevalent. Two approaches, quantitative and qualitative, have been employed. To provide the context for the study, the Northeast, as well as the case study village, are described in this chapter in four sections. Section 3.1 provides background information on the Northeast region, emphasising the geographic environment which makes the region so unfavourable to agriculture and economic development. The population, health, and economic and social implications of the natural environment are also discussed. Section 3.2 describes the demographic and socioeconomic characteristics of the study population obtained from the Thailand Demographic and Health Survey, 1987, including water supply and sanitation, and the availability of health services. Section 3.3 presents a profile of the case study village and the rural way of life, which is profoundly linked with the behaviour and health of the study population. A summary concludes the chapter.

The quotation at the beginning of the chapter reflects the past natural and cultural prosperity of the villages in the Northeast as described by Prince Damrong during his visit to Monthon Udon (the present-day Northeast) in 1906 (Nartsupha, 1984: 110-111). Fallow (1983: 149) also maintained that

> Two or three generations ago ... the people of the region enjoyed more assurance of adequate natural resources, harvests and greater social harmony than are observed ... at present.

The region's rich forest areas have also been documented. In 1952, it was estimated that more than 60 per cent of the land area in the region (about 64.1 million *rai,* where one *rai* = 0.16 hectare)) was covered by forests rich in all sorts of resources including foods and animals. Twenty-one years later, however, forest accounted for only 14.3 per cent (15.1 million *rai*) of the total land area (Puntasen, 1993: 3; Puntasen and Satitniramai, 1993: 2).

The saying '*Nai faa bo mi nam, nai din sam mi tae sai*' literally means 'There is no water in the sky, nor in the earth anything but sand', and is an appropriate description of the natural conditions of the Northeast. It reflects the scarcity of natural resources and the comparatively poor prospects for agriculture, the economic mainstay of the region. This contrasts with the famed natural abundance of the Central Plains of the Chao Phraya River Valley, the world leader in rice exports for several decades and home of the popular saying '*nai nam mi pla, nai na mi khao*' which literally means 'There are fish in the water, and rice in the paddy field'. According to the stereotype popular among the Bangkok Thai, the Northeast is an isolated backwater inhabited by poor and backward farmers (Rambo, 1991: 13). Some government officials in Bangkok share this view. For example, Klausner (1987: 25) describes how a government official tried to dissuade him from carrying out his research in a village in Ubon Ratchathani because

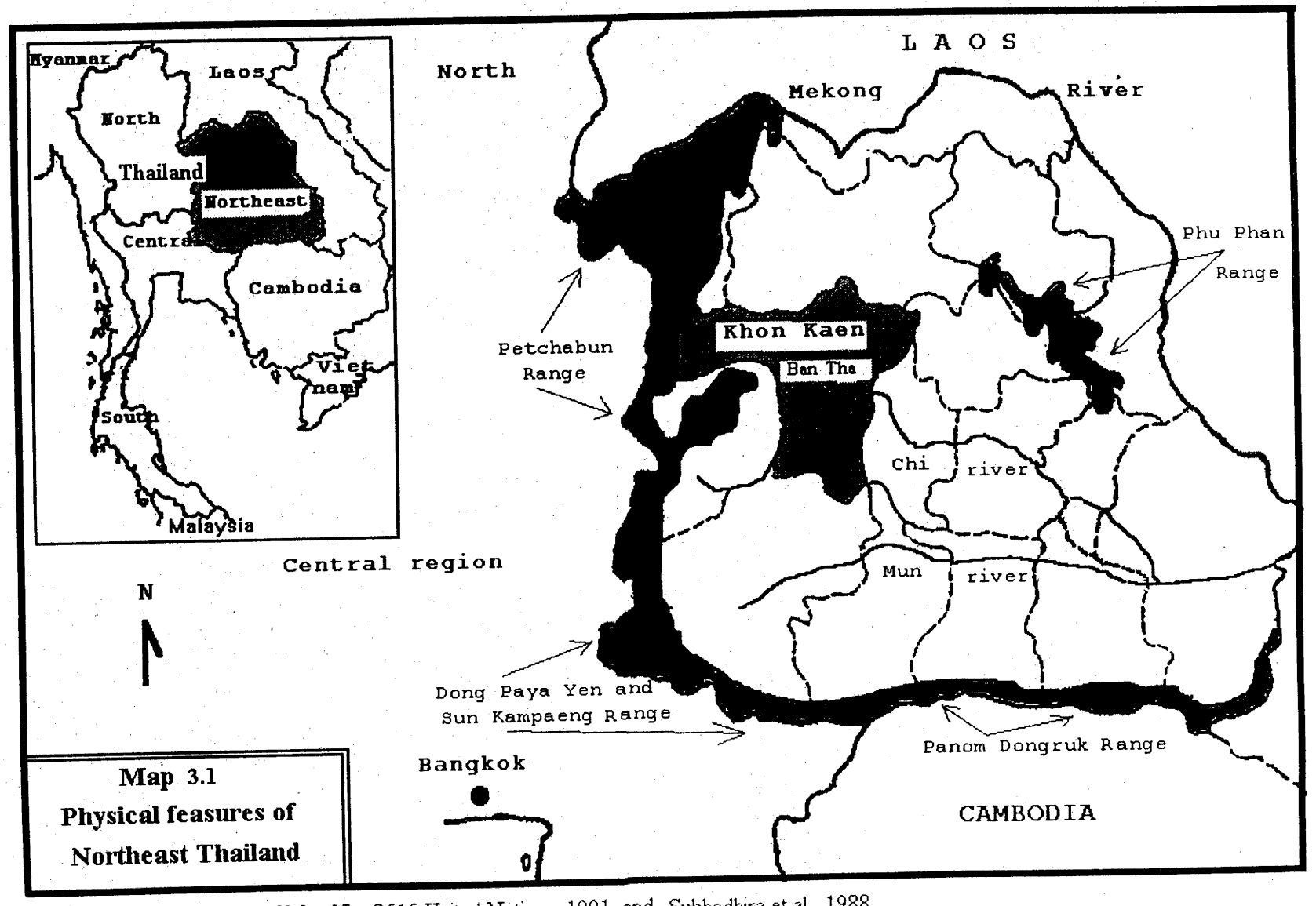
> The area was remote, the food unpalatable, the women not very attractive... They suggested I do my research in Chiang Mai or even Songkhla.

Despite the rosy picture painted by Prince Damrong, the Northeast or *Isan* has long been recorded as the poorest region in Thailand. Substantial government

investment in the development of the region since the early 1960s have hardly improved the living conditions of the majority of the population. Although basic infrastructure such as roads, schools, hospitals, and electricity has been expanded, the region remains very poor. The impressive economic performance of Thailand in the past two decades has been attained at the cost of significant deforestation and marked income disparities (Ketudat, 1990: 85; Puntasen and Satitniramai, 1993: 1), both of which are particularly marked in the Northeast. The forest has disappeared at an alarming rate. The gap between the rich and the poor has widened and the percentage of the population below the poverty line has not been significantly reduced. Economic disparities between Bangkok and other regions, particularly the Northeast, are associated with persistent social and economic problems. More and more people have moved from agriculture in rural areas to the industrial and service sectors in urban areas in search of better economic opportunities. The Northeast now faces the combined challenges of poverty, natural resource degradation, poor health, and family and social disruption all of which affect the health and well-being of the population.

3.1 Background to the Northeast

The Northeast covers an area of 170,000 square kilometres, approximately one-third of Thailand. Within these physical boundaries lie 17 of Thailand's 73 provinces. Although the Northeast is one of the earliest known archaeological sites in Asia with evidence of neolithic agriculture, pottery, and bronze ware in the present-day village of Ban Chiang, Udon Thani province (Solheim, 1986: 60; Rogers, 1989: 12; Vallibhotama, 1990: 181), the region remains unknown to most foreigners as well as to some Thai people. Its name 'Northeast' or '*Isan*' identifies the region in terms of its direction from Bangkok, the capital city (see Map 3-1).



Map 3.1
Physical feasures of Northeast Thailand

Sources: Modification of Map No. 3615 United Nations, 1991, and Subhadhira et al., 1988.

The region is landlocked, and isolated from the rest of Thailand and from the neighbouring countries of Laos and Cambodia by natural frontiers. The Phetchabun Range lies in the northwest and west of the region, separating it from Northern and Central Thailand, while the high mountain ranges of Dong Phaya Yen and San Kamphaeng Ranges in the southwest of the region separate it from Eastern Thailand and the routes to Bangkok. The Phanom Dongrak Range generally marks the national boundary with Cambodia to the south, and the Mekong River forms the northern and most of the eastern boundary with Laos (Subhadhira et al., 1988: 10; NSO, 1990; Rambo, 1991: 14). Within the region itself, the Phu Phan Range runs lengthwise from the northwest in Loei province to the southeast in Nakhon Phanom province. It divides the region into two basins, the larger Korat Basin in the central and south and the Sakon Nakhon Basin in the north (Dixon, 1978: 1; Subhadhira et al., 1988: 10).

The Northeast forms a relatively high plateau, known as Korat Plateau, compared with the low plain of Central Thailand. However, the region is far from flat. Nearly 80 per cent of the area lies between 90 and 200 metres above sea level, while the high areas in the northwest range from 200 to 1,500 metres and slope gradually toward the Korat Basin in the southeast where the major river, the Mun or Nam Mun, flows into the Mekong. Approximately three-quarters of the plateau is drained by the Mun and Chi rivers. Despite the presence of these three rivers, only about 20 per cent of the land area is suitable for irrigation or has potential for large-scale water resource development. The majority of the population, especially in rural areas, relies on small-scale water sources such as wells, ponds, and rainfall (Subhadhira et al., 1988: 10). As a consequence, only two-thirds of the total area is suitable for agriculture, 37 per cent being cultivated rice and and 29 per cent upland cash crops (Puntasen, 1993: 18-19). Soils are largely very fine sandy loams which are characteristically poor in nutrients and have a low organic content. However, fertile soils of alluvial sediments lie in the soils adjacent to streams and rivers, particularly along the Mekong River (Rogers, 1989: 34).

> Obtaining sufficient drinking water for humans and livestock is a major problem in the dry season. Many villages have either a natural or a constructed pond, but these often dry up during the long dry season. Villagers are then found to obtain water from wells, often located many kilometres away from their homes. One of the most common sights in the Northeast is long lines of women and children pushing two-wheeled carts loaded with water cans, which they have filled at the communal tank, or wells to their homes. (Rambo, 1991: 20)

Access to water has long been a problem in the Northeast as indicated above, reflecting the combination of poor soil and water conditions as well as an unfavourable climate. The climate is more continental in nature than other regions of Thailand due to its landlocked position far from maritime influence and the surrounding hill and mountain ranges in the west and south, which create a rain shadow effect over much of the southwestern part of the region. The climate is basically divided into three seasons: the cool season (November to February); the dry and hot season (March to May); and the wet season (June to October). April is usually the hottest month, when the temperature can reach as high as 46 degrees Celsius, while December and January are the coldest months (Subhadhira et al., 1988: 13). Very low humidity in the dry season causes the surface soil and beds of streams to dry and crack. Shortages of water for both household use and agriculture are common during the dry and hot season (November to April).

Annual rainfall is a little below that of other regions (1,200-1,600 millimetres in a normal year), and often insufficient to meet water requirements for agriculture and other purposes. Eighty per cent of annual rain falls during the rainy season (August to September) as heavy rains, thunderstorms, or decaying tropical cyclones move inland from the South China Sea and Vietnam (Vorasoot et al., 1985). Rainfall varies markedly from year to year and province to province. Areas closer to the southwest corner are substantially drier as a consequence of the rain shadow, some recording the lowest average rainfall in the country. In contrast, annual rainfall in the areas close to the northeast corner often reach 1,800 mm (Subhadhira et al., 1988: 13).

The prevailing soil type (about 62 per cent of the soils consist of sandy loam or loamy sand) tends to promote rapid runoff and water loss. Ground water levels

sink rapidly after rain, and most watersheds lack sufficient water to support a permanent stream. Most rivers and streams dry up in the dry season, leaving small reservoirs or swamps that are insufficient for off-season agriculture. Large areas of the region are also afflicted by saline soils. Salinity has been spreading rapidly in recent years, due largely to the expansion of large reservoirs and other surface-water sources. Forest clearing and a reduction in the number of trees standing in the paddies contribute to a rise in the water table, while salt manufacture in the region has recently accelerated the spread of saline soils (Rambo, 1991: 16; Fukui, 1993).

The Northeast is not only the poorest region in Thailand; it is also the most populous. Seven of the 10 most populous provinces in Thailand - Korat, Ubon Ratchathani, Udon Thani, Khon Kaen, Buriram, Si Sa Ket, and Surin - are in the Northeast (Alpha Research, 1992). Rapid population growth during the past three decades has created serious problems for development in the Northeast, as well as in the country as a whole. The population of the Northeast doubled within two decades, increasing from nine million in 1960 to nearly 18 million in 1980. Although the recent decline in fertility brought the growth rate down from 3 per cent in 1960 to 1.3 per cent in 1990, the absolute number was estimated to be 19 million in 1990, accounting for one-third of Thailand's population (NSO, 1992: 6).

The region has remained overwhelmingly rural and agrarian, with about 80 per cent of the population living in rural areas. However, the urban population in the Northeast grew relatively fast at 3.6 per cent per annum during the period of 1985-1988. This growth rate was much higher than the national rate, which was two per cent during the same period (Krongkaew, 1993: 4). Migration, especially rural-urban migration, has brought about impressive changes in the pattern of population distribution in Thailand as rural people search for a better life in the cities. The highest rate of urbanisation (11 per cent) has occurred in the Greater Bangkok area, covering the capital city, and the five surrounding provinces (Samut Prakarn, Samut Sakhon, Pathum Thani, Nakhon Pathom, and Nonthaburi), where new industrial factories are located (Klausner, 1987: 112; Ketudat, 1990: 85-86;

Krongkaew, 1993: 8). Massive rural-urban migration has had a tremendous impact on the region, as well as the country as a whole. Intensified economic interaction between the Central Plains and the capital city has provided a strong incentive for many Northeastern families to escape rural stagnation by sending members as migrants to Bangkok. Although rural-rural movement has long characterised migration patterns in the Northeast, rural-urban movement has become an increasing concern. The increasing ease of spatial access to cities and Bangkok made possible by expanded highways and transport services has encouraged the movement of rural Thai from both rich and poor regions, including the Northeast.

The nature and pattern of migration from the Northeast has changed markedly in recent years. Formerly, only men aged over 30 migrated to work temporarily in Bangkok or urban centres. Now, young children who have just finished primary school at age 12 or 13, girls more than boys, are an important group of migrants, with Bangkok as the preferred destination (Larson et al., 1993: 7-8). In some villages, the entire population of young people has left home, leaving only children and old people in the villages. A large number of these young rural migrants work as factory workers, gem cutters, housemaids, and in restaurants (Larson et al., 1993: 10). In 1986, 65 per cent of the child labourers in factories in Bangkok were from the Northeast (Saisuree, 1986). Remittances sent home are an important contribution to households in the Northeast, particularly for the poor who have to depend on outside income (Larson et al., 1993: 11-12). This is believed to be influenced by the strong feeling of obligation on the part of children toward their parents (Phongpaichit, 1982), and the need to maintain the social ties with their families (Larson et al., 1993: 12). However, Klausner (1987: 16-17) remarked that these migrants tend to stay longer in their place of work and may even move permanently, returning to their home towns only for short stays during village festivals or family ceremonies. Although most migrants send some money home, the amount is decreasing and is apparently not sufficient to improve the quality of life of those left behind.

Living conditions are extremely hard for the majority of the rural poor in the Northeast, who have to provide basic necessities including food from subsistence production. Although they grow rice and other vegetables, as well as raising some domesticated animals, the quantities are often insufficient. Several factors contribute to their poverty, including large family size, low productivity, the unfavourable physical environment, and massive deforestation. The Northeast's share of national GDP was only 13 per cent (Hewison, 1993). Although the economic performance of Thailand has been very impressive, regional differences between Bangkok and other regions are an increasing concern. Thailand is still a land of farmers, as is the Northeast where about 90 per cent of the population are engaged in agriculture, the vast majority as *chao na* (rice farmers). Rice is grown on roughly 80 per cent of the cultivated land (Subhadhira et al., 1988: 14). The farmers in the Northeast are small-landholders and production involves rainfed agriculture, and agriculture accounts for only 45 per cent of the gross regional product (Limpinuntana and Pattanothai, 1982: 17; Agricultural Economics Bureau, 1983: 67). The yield per *rai* is lower than in other regions due to the adverse climate, poor soils, and limited and unreliable water resources.

Rice, both non-glutinous and glutinous, is the most important food crop, and is grown on about 80 per cent of cultivated land. Glutinous or sticky rice is a staple food rather than the economic mainstay of the region (Limpinuntana and Patanothai, 1982: 11). Apart from rice, cassava, maize, and jute are important upland cash crops.

Other agricultural activities include livestock, forestry, and fishery. Livestock production provides an important source of income: the Northeast is home to 62 per cent of the water buffalo and 41 per cent of the cattle of the nation (Fukui, 1993: 21). The Northeast formerly supplied water buffalos to the Central Plain for rice growing. Water buffalos have been increasingly replaced by machinery in recent years. However, buffaloes are kept as work animals and are used as a source of food in the region (Fukui, 1993: 21). Forestry and fishery also contribute

to the rural economy. The collection of natural foods from forests and paddy fields provides a major source of food and nutrition for most of the rural population (Somnasang et al., 1988: 78; Subhadhira et al., 1988: 15; Saowakontha et al., 1989; Rambo, 1991: 24). However, increasing deforestation and soil erosion has had a devastating impact on these food sources, contributing to the continuing poverty, and poor health and nutrition of the population at large.

In the Northeast, many rural people maintain their traditional culture and rural lifestyle, including a belief in Buddhism (95 per cent of the population is registered as Buddhist). The region is generally divided into two main cultural groups: a glutinous or sticky rice-eating cultural area in the north and centre and a non-glutinous rice-eating cultural area in the south (Rogers, 1989: 47). There is considerable ethnic diversity. *Isan* has a mix of three major ethnic groups: Lao, Khmer, and Thai-Korat. The Lao, the largest group, occupy areas in the central and northern part of the region. The second largest ethnic group is the Khmer who are concentrated in the southerly provinces (Buriram, Roi-Et, Surin, Sisaket, and Ubon) along the Thai-Cambodian border. The Thai-Korat are a group of mixed Siamese and Khmer ethnicity who live in the southwestern provinces such as Nakhon Ratchasima (Subhadhira et al., 1988: 14; Rogers, 1989: 48; Fukui, 1993: 34). Other important ethnic groups include the Phuthai (in the northeast provinces of Sakhon Nakhon and Nakhon Phanom). Vietnamese, who migrated to the Northeast during the final phase of the French-Viet Minh war in the 1950s, settled in five provinces (Udon Thani, Nong Khai, Nakhon Phanom, Ubon, and Sakhon Nakhon), with most living in towns and urban centres. The Chinese, who have long been established in the Northeast, are also concentrated in urban centres. A small number of persons of Indian origin, mainly Sikhs, are also found in urban centres (Subhadhira et al., 1988: 14; Rogers, 1989: 47-48). Language and culture distinguish the Thai-Isan of the Northeast from the Central Thai. The large majority of Isan people speak their local language which varies according to ethnicity. However, the use of the Central Thai

language is compulsory in schools, and no deliberate campaign has been made to suppress local culture (Fukui, 1993: 35).

This section has presented a broad picture of the physical, demographic, social, and economic characteristics of the Northeast. The next section focuses on descriptive characteristics of the study population with the data derived from TDHS.

3.2 The Northeast population: data from the TDHS

This section describes the characteristics of ever-married women aged 15-49 with children under five in the Northeast, using data obtained from the Thailand Demographic and Health Survey 1987. This section consists of four sub-sections: the first covers the demographic characteristics, the second socio-economic conditions, the third household water supply and sanitation, and the fourth availability of health services. These sets of variables will be used to analyse the relationship with the dependent variables (child nutrition and diarrhoea, and utilisation of health services) in later chapters.

3.2.1 Demographic characteristics

Demographic variables such as age, sex, and ethnicity are well documented as being associated with the nature of health and utilisation of health services. The age of children under five and their mothers is examined here. The age distribution of ever-married women was derived from reported birth dates. Those women whose birth dates were not stated were asked to state their age at last birthday. At the national level, most (89 per cent) ever-married women were able to report both month and year of birth. About 10 per cent reported only year of birth, while only one per cent were not able to report either month or year. For those who reported incomplete birth dates, age was imputed using the local or animal year of birth, which is widely known within the Thai cultural context (Chayovan et al., 1988: 21). In the case of children, slightly more than half of the data on age was obtained from birth certificates (Chayovan et al., 1988: 111).

Table 3.1 presents the demographic characteristics of ever-married women, classified by urban-rural residence. The proportion of rural ever-married women aged under 20 years was slightly higher than that of urban women. In the middle age groups, 20-34 years, a higher proportion of urban women was represented. Reflecting the slight difference in age distribution, the average age of urban women was about one year younger than in the rural sample. The higher proportion of rural residents results in the national age distribution of ever-married women resembling the rural pattern.

Forty-six per cent of urban ever-married women and 34 per cent of rural ever-married women had only two children, but about one-quarter of rural women had four or more living children compared with only nine per cent for urban women. Thus, rural women on average had more children (2.6 children) than those in urban areas (2.2 children).

The demographic characteristics of children aged 0-59 months born to those ever-married women were also examined. As expected, the proportion of male and female children in the sub-sample was similar.

Most children were breast-fed, although patterns of breastfeeding between the urban and rural samples differed. A higher proportion (10 per cent) of urban children had never been breast-fed, compared with rural children (two per cent). Among children who had ever been breast-fed, rural children had longer duration of breast feeding. For example, nearly half the rural children were still breastfeeding at the time of the survey while the corresponding figure for the urban children was only about one-third. However, on average, urban residents had younger children than those in rural areas. For example, about one-quarter of urban children were in the youngest age group (0-11 months), whereas the corresponding figure for rural children was about 18 per cent (Table 3.1). Consequently, the rural children were about three months older on average than the urban children.

Table 3.1 : Ever-married women aged 15-49 with children under five by selected demographic characteristics and place of residence, Northeast Thailand, 1987

Characteristics	Percentage of women			Number of women
	Urban	Rural	Overall	
Current age of woman (years)				
15-19	4	6	5	38
20-24	31	26	28	202
25-29	29	29	29	213
30-34	22	21	21	155
35-49	13	18	17	127
Mean age of women	27.7	28.5	28.4	
Number of living children				
One	23	25	25	183
Two	46	34	37	270
Three	21	21	21	154
Four or more	9	20	17	128
Mean number of children	2.2	2.6	2.5	
Sex of youngest child				
Boy	45	52	51	373
Girl	55	48	49	362
Age of the youngest child (months)				
0-11	21	18	19	137
12-23	23	21	21	157
24-35	23	19	20	145
36-47	21	19	20	144
48-59	13	23	21	152
Mean age of child	27.0	30.2	29.5	
Breastfeeding of the youngest child				
Never breast-fed	10	2	3	25
Stopped breastfeeding	64	59	59	432
Still breastfeeding	26	39	35	255
Total	20	80	100	735

Notes: 1. Number of children may not add to 735 due to missing cases.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS data tape, 1987.

3.2.2 Socio-economic characteristics

The importance of socioeconomic factors in health and utilisation of health services is well documented. Education of the mother, in particular, is the most powerful determinant of health (Caldwell, 1979; Frenzen and Hogen, 1982). Yet the mechanism through which education operates is not clear. The individual and household socio-economic characteristics of ever-married women aged 15-49

include the education and type of occupation of the individual women as well as their husbands. Type of family (whether couples lived with parents or not) and ownership of certain household items are some of the household characteristics considered.

The majority of women (86 per cent) had at least attended primary school regardless of place of residence (Table 3.2). As in most developing countries, more rural women had only primary education (92 per cent of rural women compared with 64 per cent of urban women). Slightly more than one-third of urban women had secondary or tertiary education (most of these institutions are in urban areas), in contrast to only five per cent of rural women.

Table 3.2 : Ever-married women aged 15-49 with children under five by education, occupation and place of residence, Northeast Thailand, 1987

Characteristics	Percentage of women			Number of women
	Urban	Rural	Overall	
Level of education of women				
No education	0	4	3	21
Primary	64	92	86	631
Secondary	23	3	7	52
Higher	13	2	4	31
Literacy of women				
Read easily	72	37	44	324
Read with difficulty	25	48	44	320
Cannot read at all	3	15	12	91
Education of women (combined level and literacy)				
Cannot read at all	3	15	12	91
Primary-illiterate	25	48	44	320
Primary-literate	36	32	33	241
Secondary or higher	36	5	11	83
Current occupation				
White collar	16	2	5	38
Blue collar	19	8	10	76
Agriculture	2	27	22	159
Services	11	2	4	27
Not working	52	61	59	435
Total	20	80	100	735

Notes: 1. Number of women may not add to 735 due to missing cases.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS data tape, 1987.

Literacy is another indicator of education. The ability to read differed markedly according to place of residence. Although the majority of women (97 and 85 per cent for urban and rural women respectively) were able to read, the level of reading ability varied considerably. The ability to read was classified into three broad groups: can read easily, can read with difficulty, and cannot read at all. About three-quarters of urban women could read easily, whereas the corresponding figure for the rural women was only one-third. More women who were not able to read lived in rural areas (15 per cent compared with three per cent for urban women).

Not all women who attended formal school could read, as no urban women reported that they had no formal education, but three per cent reported that they could not read at all. A similar phenomenon occurred among the rural women. Therefore, a single variable for education was developed by combining the level of education and literacy for use in the bivariate and multivariate analyses in the study. Most rural women were in the category 'some primary education and reads with difficulty'.

Generally, the reported education of husbands was higher than that of their wives, regardless of the indicator used. However, as among women, urban males had higher education than their rural counterparts. For example, slightly more than half of the urban males were reported to have had at least secondary or tertiary education, while only one-tenth of rural males had secondary or higher education. The majority of rural males (88 per cent) reported attending formal school at the primary level, compared with only one-third of those in urban areas. A single index of husband's education was also computed by combining the level of formal education and literacy. A very small number of men were illiterate (could not read at all). This category was combined with 'primary level and reads difficulty' to comprise the lowest education level. Again, the higher educational attainment was found among urban males, almost 60 per cent being literate or having secondary or higher education. The corresponding figure for rural males was only 10 per cent.

Occupation is one of the important variables representing socioeconomic status, although its effect on health status is relatively complex. However, the classification of occupation variable employed in this study which is based on occupational status (Pol and Thomas, 1992: 312) is expected to have a positive relationship with health status. In this study, the data on current occupation were derived from two questions: 'What kind of work does (did) your husband/partner mainly do?'; and Are you now working including work on a farm or in a business run by your family?' Note that the reference period of 12 months prior to the survey was used in the survey of population change (NSO, 1989: 31). The data were grouped into five broad categories: white collar, blue collar, agriculture, service and unskilled manual, and not working. However, in the case of the husband's occupation, the category 'not working' was disregarded in the analysis, due to the small number of cases in the group (only two cases). The classification of residence was associated with differences in occupational structure. Only two per cent of urban women and three per cent of urban husbands worked in agriculture (Table 3.3).

The largest proportion of women in both urban and rural areas were classified as not working. Surprisingly, due to the high female labour force participation rate in Thailand, more than half of the women reported not working at the time of the survey, although the figure was lower in urban (52 per cent) than in rural areas (61 per cent) (Table 3.3). One possible explanation is that the survey was conducted during the slack season (March-June 1987), that is, before planting, so that most women who were normally engaged in agriculture were free from work. For urban dwellers, most available jobs would have been in the industrial sector or other non-agriculture sector, but the proportion of women not working was still pronounced. This is probably due to the definition of work employed in the survey, which was limited to work that earns benefit in either cash or kind. Women who did some other unpaid work or helped to run a family business may not have been recognised as working. Formal-sector work, including white-collar, blue-collar and

services, were largely confined to urban areas for both women and their husbands, whereas the majority of rural men engaged in agricultural work.

Table 3.3 : Ever-married women aged 15-49 with children under five by husband's education, occupation and place of residence, Northeast Thailand, 1987

Characteristics	Percentage of women			Number of women
	Urban	Rural	Overall	
Level of education of husband				
No education	1	2	2	11
Primary	39	88	78	573
Secondary	46	8	15	112
Higher	14	3	5	35
Literacy of husband				
Read easily	89	67	72	524
Read with difficulty	8	27	23	170
Cannot read at all	3	6	5	37
Education of father (combined level and literacy)				
Cannot read at all	3	26	25	37
Primary-illiterate	8	27	24	172
Primary-literate	29	57	51	376
Secondary or higher	59	10	20	147
Husband's occupation				
White collar	15	4	6	42
Blue collar	56	10	19	138
Agriculture	3	81	65	468
Services	27	5	10	69
Total	20	80	100	735

Notes: 1. Number of women may not add to 735 due to missing cases.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape.

Type of family is included in the analysis on the grounds that family support, particularly in rural communities, may indirectly influence health and use of health services through a number of pathways including child care substitutes, mediators, and decision makers. Table 3.4 presents the percentage distribution of ever-married women according to type of family by place of residence. Questions were asked about whether the parents of the wife and husband were still alive, whether women lived with their parents or their husbands' parents after first marriage, and the duration of stay in the parents' household. Three variables regarding type of family were explored in the study: lived with parents, either with own parents or parents-in-

law; wife's parents still alive; and husband's parents still alive. Most newly married couples lived with their parents after marriage (82 per cent for the region as a whole). However, the proportion was not equally distributed across regions. As many as 37 per cent of urban couples lived separately from their parents, but only 13 per cent of rural couples did so. Perhaps this reflects the socio-cultural context. The social and economic changes that have occurred recently in Thailand have tremendously affected the way of life of the people, especially in urban areas, whereas rural dwellers tend to maintain their traditional way of life. The extended family is more common in rural than in urban areas.

Table 3.4 : Ever-married women aged 15-49 with children under five by type of family and place of residence, Northeast Thailand, 1987

Characteristics	Percentage of women			Number of women
	Urban	Rural	Overall	
Lived with parents after married				
Lived with parents	31	64	58	423
Parents lived with respondent	32	22	24	177
Lived separately	37	14	18	135
Currently living with parents				
Living with parents	12	22	20	143
Parents live with respondent	9	17	15	109
Living separately	80	62	65	475
Mother still alive				
Both mothers	66	56	58	424
Own mother	18	21	21	150
Husband's mother	11	14	13	95
None	6	9	8	59
Father still alive				
Both fathers	45	43	43	304
Own father	17	22	21	147
Husband's father	18	15	16	109
None	19	20	20	142
Total	20	80	100	735

Notes: 1. Number of women may not add to 735 due to missing cases.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape.

The variable measuring whether the respondents currently lived with their parents or their parents-in-law was divided into two broad categories for the

bivariate and multivariate analyses, that is, whether or not women lived with their parents or parents-in-law after marriage (i.e. either couples living with parents or parents living with them). More women lived with parents immediately after marriage than at the time of the survey. Both urban and rural residents reported a substantial majority not currently living with parents: 80 per cent for the urban sample and 62 per cent for the rural sample.

Whether the parents or parents-in-law were still alive was also examined. In a society where family ties are strong, the influence of old people is important. Therefore, it is relevant to examine this variable in more detail. At the time of survey, both partners' mothers were mostly still alive (66 and 56 per cent of urban and rural women respectively). Seven per cent of urban respondents stated that their mothers had died, whereas the comparable figure for the rural respondents was 23 per cent. More women than men had living mothers. Similar patterns were found for fathers: a large proportion of fathers were still alive. However, the magnitude in almost all categories was lower compared to the case of mothers. The observed patterns reflect the fact that most Thai women were married to men who were older than themselves and that the life expectancy of males was a few years shorter than that of females.

The ownership of selected household items to be discussed here includes electricity, radio, television set, refrigerator, and motorcycle. Ownership of these items can be used to indicate household economic status; thus higher economic status households are likely to be healthier and are more likely to seek professional health care when sick than those with low economic status. However, some items may have some other significance beyond economic status. For example, radio and television can be regarded as sources of health information. Especially in rural areas in Thailand where electricity is not yet available, radio is the only mass medium from which rural people can access health information. For most urban residents, however, a refrigerator may not be considered a wealth indicator. It is rather an

essential item that every household has to own and use for purposes such as storage of fresh food and drinking water.

Seventy per cent of households in the Northeast region have electricity. There was a dramatic difference in household ownership between urban and rural residents. Again urban residents were more advantaged in access to many items such as electricity, with as many as 97 per cent having electricity while the corresponding figure for rural respondents was 64 per cent. Normally, wherever people had access to electricity, other electrical items such as television sets, rice cookers, or even stereos were also available. Ownership of electrical items such as television sets and refrigerators was also found to be higher for urban residents than those in the rural areas (Table 3.5).

Table 3.5 : Ever-married women aged 15-49 with children under five by household possession and place of residence, Northeast Thailand, 1987

Characteristics	Percentage of women			Number of women
	Urban	Rural	Overall	
Has electricity				
No	3	36	30	217
Yes	97	64	70	518
Owns radio				
No	29	39	37	273
Yes	71	61	63	461
Owns television set				
No	33	78	69	506
Yes	67	22	31	229
Owns refrigerator				
No	47	94	85	623
Yes	53	6	15	111
Owns motorcycle				
No	53	83	77	564
Yes	47	17	23	171
Total	20	80	100	735

Notes: 1. Number of women may not add to 735 due to missing cases.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape.

3.2.3 Household water supply and sanitation

Water supplies are available to the Northeast region in varying degrees and from various sources such as piped reticulation, bottled water, rain, wells, and ponds. These sources were classified into three broad groups for drinking water, and two groups for non-drinking water. This classification reflects the quality of drinking water, with the first two water sources (piped and bottle water) considered clean and safe for drinking. As shown in Table 3.6, there was a substantial difference in type of water used in households between urban and rural residents. Access to better quality water was highest in urban areas: 64 and 63 per cent of urban dwellers used piped or tap water for drinking and for other household use respectively, while the corresponding figures for rural residents were as low as one and 14 per cent. Rain water is considered another safe source of water for drinking and is heavily used in rural but not in urban areas. However, the majority of rural residents still rely on well water, which can be unhygienic, for household consumption (76 and 92 per cent for drinking and non-drinking water respectively).

Table 3.6 : Ever-married women aged 15-49 with children under five by household water supply and sanitation and place of residence, Northeast Thailand, 1987

Characteristics	Per cent of women			Number of women
	Urban	Rural	Overall	
Source of drinking water				
Pipe water	64	1	14	104
Rain water	13	22	21	151
Well or other	23	76	65	480
Source of non-drinking water				
Pipe or rain water	63	8	20	143
Well or other	37	92	80	592
Owns toilet facility				
No	5	61	49	363
Yes	95	39	51	372
Total	20	80	100	735

Note: Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape.

In relation to the household sanitation, although a question was asked about the type of latrine, there was no noticeable variation. Therefore, the variable was grouped into two broad categories: household owning latrine or no latrine. Nearly half of the households in the Northeast region had no toilet facility. Again, there was a marked difference in the proportions of households possessing latrines by area. While almost all urban households owned toilets, only 39 per cent owned them in rural areas.

3.2.4 Availability of health services

Data used to analyse the availability of health facilities were drawn from the community data that were part of the special survey of the TDHS. The community survey conducted by the survey supervisor team used a group interview approach, interviewing at least three village leaders, such as the village headman, health volunteer, and the leader of a housewives' group (if possible). Apart from interviewing key informants in the village, the research team also visited the nearest health facilities mentioned by the key informants. Additional data were collected on number and type of health personnel, type of health services available, as well as the years when the services were first introduced. This information was considered to reflect 'theoretical access' rather than 'actual access' since the data refer to the nearest health facilities rather than the facility which people were most likely to visit when they were sick.

The data on access were available for rural villages only. In accordance with the purpose of this study, which emphasises the utilisation of health services in the region as a whole, variables to measure access to health services need to be imputed for urban residence. It was assumed that access to all services was at least as good in urban areas as in any rural area. As discussed in Chapter Three, both private and public health facilities are concentrated in cities and 'sanitary areas' in Thailand. Even at the district level, there is at least a district health centre or a district hospital under the Ministry of Public Health which provides health services throughout the district. Some districts where road access is good may have other private clinics as

well. In terms of distance and the time taken to reach health facilities, which are of interest regarding access to health services in the study, it was also assumed that for urban residents these variables fell into the best access categories.

Table 3.7 presents selected variables indicating access to health services in the Northeast region. The second column illustrates the actual data for rural residents while the third column presents the situation in the region as a whole (including the imputed information for urban residence). The majority of rural residents lived far from the city, nearly half (49 per cent) coming from 50 kilometres or further from the provincial city. Type of main road access to the city being another aspect of accessibility, the data show that more than one-third (36 per cent) of rural respondents lived in a village where the main road access was unpaved or badly paved. However, in general, the road access in the Northeast was quite good, and about 70 per cent of the places had access through a paved road.

Table 3.7 : Ever-married women aged 15-49 with children under five by type of health service, Northeast Thailand, 1987 (Percentage)

Type of access	Percentage of women	
	Rural area	Whole region
Distance to nearest provincial town		
< 10 km	2	22
10-19 km	12	9
20-29 km	13	10
30-49 km	25	20
50-100 km	44	35
> 100 km	5	4
Type of main road access		
Paved asphalt/cement	16	34
Paved laterite (good)	47	38
Paved laterite (bad) or other	36	29
Type of public health facility in location		
None	63	50
Health centre only	26	20
Community hospital	11	20
Other hospital	0	9
Total	100	100
	(585)	(735)

Notes: 1. Figures in parentheses are number of children.
2. Percentages may not add to 100 due to rounding.

The type of public health facility available in the location was classified into four categories: no health facility at all; health centre only; community hospital (or formerly second class health centre); and other hospital (all of these are assumed to be available in urban areas). The majority of rural respondents fell into the first category (63 per cent); about 25 per cent resided in a place where there was only a health centre available, and only 11 per cent lived in a place where there was a hospital. At the regional level, almost half of respondents (50 per cent) resided in villages without any type of public health facility while about 20 per cent had at least a health centre available, and nearly 30 per cent lived close to a hospital.

The data on distance to nearest hospital and health centre show that in the rural Northeast region the average distance to the nearest hospital and health centre was about 13 kilometres and three kilometres respectively (Table 3.8). Although some villages were not equipped with any kind of public health facility, such a facility, especially the health centre, was quite accessible. The majority of women (61 per cent) lived in villages where physical access to the health centre was less than two kilometres. A single variable for distance to nearest public health facility was constructed by combining the distance to a health centre and distance to a hospital. Thirteen per cent of respondents resided within a radius of five kilometres of a health centre or a hospital or both, but the largest proportion of women (38 per cent) were at least 15 kilometres from the nearest public health facility. Including the imputed data for urban women, 31 per cent were classified as having easy access to health facilities.

As expected, access to a community-based health centre was far better than for sophisticated health institutions such as hospitals. As a result, the average time to reach the nearest health centre was only 25 minutes, compared with 48 minutes to the nearest hospital. The majority of respondents (61 per cent) were able to reach the nearest health centre in less than 10 minutes, whereas the corresponding figure for the nearest hospital among rural respondents was only eight per cent. Figures for the whole region were similar to those for the rural areas. A single variable of

time was also examined here. Ten per cent of rural respondents were able to reach the nearest public health services within 10 minutes while the corresponding figure for the whole region including urban areas was 28 per cent.

Table 3.8 : Ever-married women aged 15-49 with children under five by distance and time to the nearest public health facility, Northeast Thailand, 1987 (Percentage)

Type of access	Percentage of children Rural area	Whole region
Distance to nearest hospital		
< 6 km	15	32
6-15 km	47	38
> 15 km	38	30
Mean distance	12.7 km	
Distance to nearest health centre		
< 2 km	62	69
2-4 km	19	15
> 4 km	19	15
Mean distance	2.9 km	
Time to nearest hospital		
< 10 minutes	8	27
10-30 minutes	31	25
31-60 minutes	35	28
> 60 minutes	26	21
Mean time	48.4 minutes	
Time to nearest health centre		
< 10 minutes	51	61
10-29 minutes	32	25
> 29 minutes	17	14
Mean time	24.8 minutes	
Distance to nearest public health facility (combined)		
< 6 km to HC or HOS	13	31
6-10 km to HC or HOS	24	20
11-15 km to HC or HOS	25	20
> 15 km to HC or HOS	38	30
Time to nearest public health facility (combined)		
< 11 min to HC or HOS	10	28
11-30 min to HC or HOS	30	24
31-60 min to HC or HOS	35	28
> 60 min to HC or HOS	26	21
Total	100 (585)	100 (735)

Notes: 1. HC = Health centre, HOS = Hospital, and min = minute.
2. Percentages may not add to 100 due to rounding.
3. Figures in parentheses are the number of children.

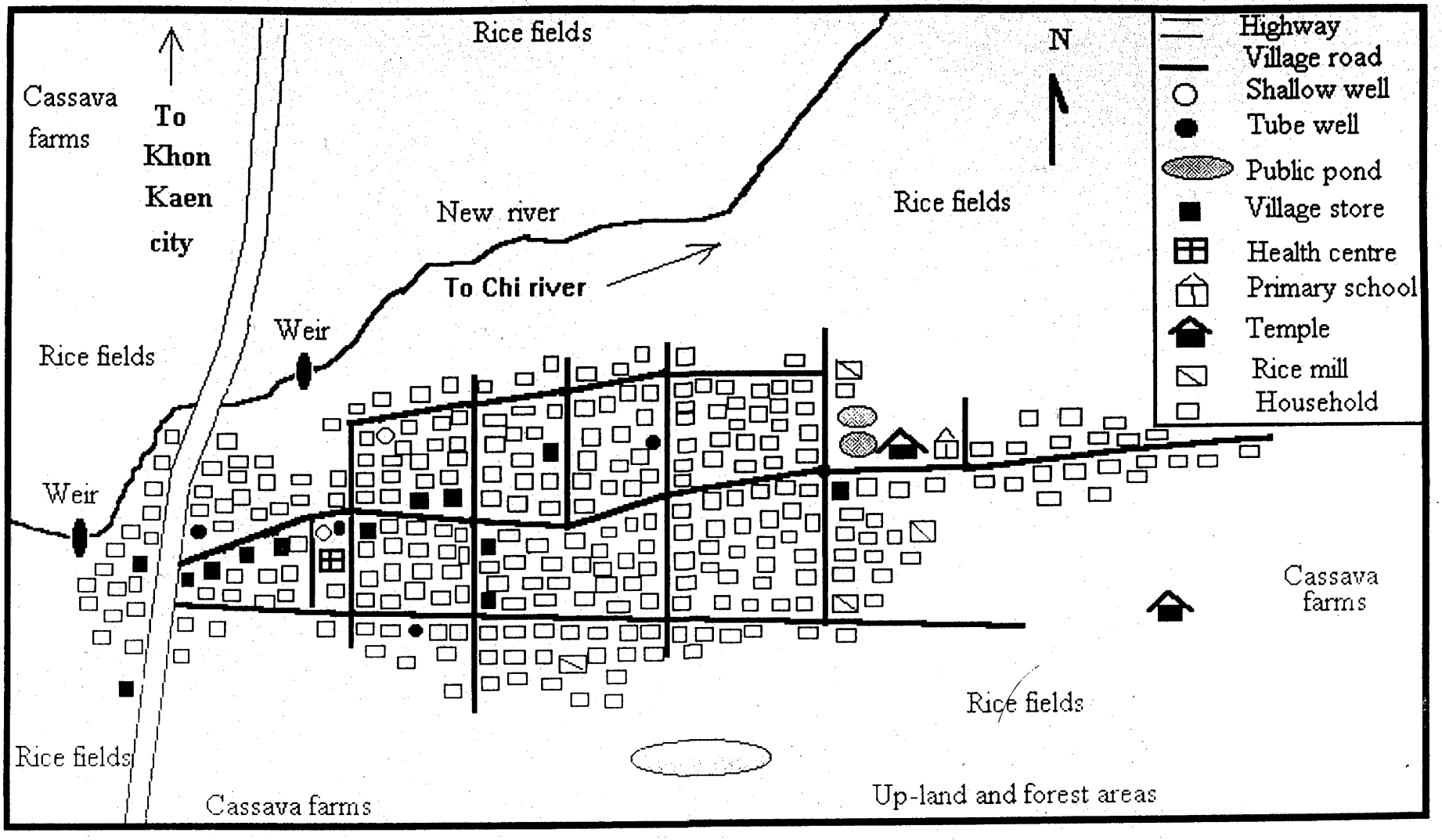
Source: Subset of TDHS 1987 data tape.

This section has discussed the population characteristics of the Northeast based on the 1987 TDHS data. These data formed the basic explanatory variables to be used in analysis in the following chapters. The next section will describe the geographic, and socio-economic characteristics of the case study village.

3.3 Profile of Ban Tha: the case study village

The village is situated in the highlands of the Korat plateau, about 32 kilometres by road southwest of Khonkaen, the provincial capital, 15 kilometres north of District A centre, and eight kilometres south of the other. The village is administered under Amphoe Phu (pseudonym for the district). Historically, the village is said to have been first settled by about five families of farmers from a nearby village who had lived close to farmland west of the village for at least a hundred years. As new families arrived or were created, a new house would be built within a family compound.

The village covered an area of settlement and home gardens of about 1,200 *rai*. The area occupied by the village had expanded over time, due to population increase. The landscape can be broadly classified into the following zones: lowlands paddy fields for wet rice cultivation; household settlements with small home gardens; streams and small dams (weirs); upland areas with cash crops such as cassava, sugar-cane, and fruit; a commercial logging area planted with eucalyptus; and graveyard and forest areas (see Maps 3-2). The land slopes gradually towards the New Stream, which runs through the north of the village and drains into the Chi River 20 kilometres to the east. Two small streams through the village facilitate drainage from the higher southern section of the village.



Map 3.2 : The case study village (Ban Tha)

Residents reported that two decades earlier the forests in the southeast and south were rich in timber, wild animals, and natural foods. People from the village and surrounding villages had relied on the natural resources, hunting and gathering all year round. Under government policy of the early 1980s, the forest was closed and villagers were not allowed to cut down trees. The forest was converted to commercial logging by felling the native trees, clearing the land using tractors, and planting fast-growing eucalyptus trees. Deforestation removed the natural barriers that had slowed runoff from torrential rain in the highlands, causing erosion. The road was cut off during heavy rain, and sand was deposited by floods from the upland and forest areas, accumulating in the base of the stream and causing it to change direction.

Roads provided the only means of local transportation and could be used throughout the year. In the past, the only road that linked the village with the provincial town was a rough track heading eastward to the Friendship highway more than 30 kilometres away which links the Northeast and Bangkok. During the 1950s and 1960s, political movements and communist insurgency in the Northeast and throughout Thailand, and the threat of separatism, led the central Thai government to accelerate development in the Northeast. Several development projects were begun, including road construction. In the late 1960s, a new road was built on the western edge of the village. This new paved highway gave villagers in Amphoe Phu easy access to Khon Kaen provincial towns and other nearby districts and provinces. The road linked the village to the highway between the Northeast and Bangkok and the Central region, thereby allowing access to neighbouring provinces. This project encouraged some villagers to build houses closer to the new road. At the time of field research there were more than 20 houses along the highway and many more were planned.

In 1992, road communications between the village, Khon Kaen, and other provinces were easy. Roads had been quite bad in the past, but after the highway was built, private transport developed to convey passengers between villages and

towns. The means of conveyance included both buses and small trucks which had been outfitted to accommodate passengers. The bus service was quite regular, several buses plying the route in each direction every hour. However, communications between the village and neighbouring villages were not so easy. There was no regular bus service. Minibuses or vans (*rot song thaew*) operated to some villages, or villagers had to walk or use bicycles or motorcycles. In 1992, more villagers were using their own or hired motorcycles to travel longer distances.

As in most of the Northeast, rainfed agriculture formed the basis of the village economy and glutinous rice was the staple food. In good years, the rain fell from mid-April to May, flooding the paddy fields. In bad years, wet rice could be grown only in the lowlands paddy fields along the streams. The village had occasionally been affected by floods and drought. At the time of field work, the most recent flood had occurred in 1989, followed by two years of drought. The weather during the fieldwork period was one of the hottest and driest periods of the year. No daily temperature was recorded, but one could feel the heat wave. The sun was very strong throughout the day and the first rain did not come until late May.

The village stream carried a low volume of water; so water pumps were used to draw water to nearby paddy fields. Only villagers who could afford to hire the water pump were able to grow rice in a bad year. Otherwise, the paddy fields were left idle due to the lack of water. Three small dams had been built across the streams in order to retain flood waters for use in the dry season. The villagers whose paddy fields lay along the stream used the water for livestock, growing vegetables, and fishing. The streams dried up during the cool season (November to February) and the hot season (March to May). On the outskirts of the forest five kilometres south of the village a newly-built public reservoir retained rain and flood water for many purposes during the dry season.

Rain water is culturally acceptable for drinking and was a prime source of drinking water in the village. Traditionally, the villagers stored rain water for

household consumption in small clay jars, but during the dry season they obtained drinking water from shallow wells, or ponds. Although the water obtained from tube-wells was considered to be clean and safe, the villagers rarely drank it because of the taste. The taste of underground water in most of the Northeast was unpleasant due to the high mineral and salt content (Hewison and Tunyavanich, 1990: 129). However, the 'earthy' taste of water from shallow wells and surface water was locally accepted. From the mid-1980s, the use of large-capacity (2,000 litres) cement jars had been promoted by the government to provide safe drinking water in the dry season. Villagers were able to acquire jars through the Rural Employment Generation Program (REGP) or other government projects. According to the health centre records, two-thirds of the households owned large jars in 1991.

Two shallow public wells (one about two kilometres from the village in the upland field and another one-and-a-half kilometres away in the paddy field) provided alternative sources of drinking water during the dry season. Six public tube-wells, two shallow wells in the village, and two ponds at the Buddhist temple provided water for household consumption other than for drinking throughout the year. A personal bucket attached to a long rope (long enough to reach a depth of about 15-20 metres) was used to fetch water from a shallow well. However, in the dry season, the water level in tube-wells was often low or they dried up. On a hot day in April, a line of two-wheeled carts filled with plastic cans or small jars could be seen waiting for the water to rise high enough for the cans to fill. The villagers, mostly children, went to fetch water in the evening or early in the morning before engaging in daily activities. The water points became meeting places and playgrounds for the villagers, especially teenagers. In extremely dry years, a truck loaded with water tanks from the provincial town made two to three visits a day to the village to provide water for household use.

Women and children of Ban Tha, Northeast Thailand

Population statistics obtained in 1991 from the official population register kept by the *kamnan* (sub-district or *tambon* chief) showed that the village population consisted of 558 males and 575 females, a total population of 1,133. There were 264 households registered, indicating an average household size of 4.3 persons. The vital statistics indicated that in 1991 12 children were born, and five persons died. The total number of women of reproductive age (15-44 years) was 168. The two hamlets in the village had 194 households and 53 households. Most of the population were born in the village, and in-migration was almost entirely through marriage. According to the *kamnan*, 27 persons had migrated in to live with their spouses. Nine women and five men who were born in other villages had moved into the village to live with their in-laws after marriage. Three men from a nearby town had also come to live in the village, while two families (a total of 10 persons) who had no previous family connections with the village had moved in to operate village shops. Out-migration by marriage was also common, but no exact statistics could be obtained. I was told that more than 50 persons had moved from the village.

Both internal and international migration was common among the villagers, and many villagers had worked or lived outside the village. Most migrants were teenagers and young adults who, after finishing compulsory education, travelled to big cities such as Bangkok, Samut Prakarn, Phuket, and Chonburi searching for paid jobs, which were difficult to find in the Northeast. Most were able to find a job and stayed away for many years, returning briefly to the village once a year. However, regular communications were maintained with their families through letters and other migrants who returned to the village. Many returned to the village permanently after getting married. The success of villagers in the cities who sent money home to build big houses and improve the living conditions of those left behind encouraged more villagers to leave home in search of paid work.

Between March and April 1992, when I was in the village, almost all the migrants returned to their home town for a short visit during the period of village festivals and ceremonies throughout the Northeast. Villagers who worked

permanently in other regions, as well as those who worked occasionally in the sugar-cane fields, also returned to meet their families and friends and to attend the annual *songkran* festival (formerly the Thai New Year) and brought back with them material goods and money. This is the only occasion during the year when employers allow their employees to take a long vacation, and they prefer to return to their villages. Travelling during this time of the year is hectic because so many passengers travel from Bangkok and the Greater Bangkok area to their home towns, particularly to the Northeast and North. In order to observe this phenomenon, I made two trips between Bangkok and Khon Kaen province on 25 February and 30 March 1992.

On my first trip, I travelled by train from Hua Lum Pong railway station, the centre for rail transportation in Thailand. When I arrived at the station one hour before the departure time (3.30 p.m.), thousands of passengers were waiting for the train. When I got into the carriage, I could hardly make my way through. Passengers not only sat on seats, but also sat on the floor or stood. I estimated that the train carried three to four times the usual number of passengers (one carriage could accommodate 85-90 passengers). One passenger with whom I talked had just returned from the South, where he had worked on a rubber estate. Four entire families, made up of 17 persons from the same village in Udon Thani province, had migrated to Songkhla province in the South and had worked there for approximately two years. Three consecutive years of drought in their village had driven them to search for agricultural work elsewhere. They decided to go south because one of the group had previously worked there and so was acquainted with local people and places.

I made my second trip to Khon Kaen by bus from the Mawchit bus terminal in Bangkok, the centre for bus services to the Northeast and the North regions. The crowds at the bus terminal were even bigger than at the train station. Passengers and their relatives waited patiently for the next bus to depart the terminal. Although several buses loaded with passengers had left the platforms, they made little

difference to the size of the crowds. More and more people were arriving in the terminal. Many had come without knowing where their buses left from, and many had not yet purchased tickets. Because of the extremely high demand for transport, tickets could not be booked in advance. People crammed into the bus terminal in the hope of getting tickets. My bus eventually departed from the terminal at 10.50 p.m., 20 minutes later than the schedule. The 40-seater air-conditioned bus was carrying seven passengers over the legal limit. The bus owner had provided extra seats and placed them in the aisle and other available spaces on the bus. Relief appeared on the faces of those who were able to leave the bus terminal, but hundreds of other passengers remained there, not knowing at what time they would be able to get to their home towns. They only hoped for enough space on a bus to be able to visit their home towns on this one occasion each year.

Seasonal migration has always been common in the village. Most seasonal labourers moved temporarily to the western and eastern provinces in the Central region, such as Kanchanaburi, Ratchaburi, Suphanburi, Nakhon Pathom, Prachuap Khiri Khan, Chonburi, and Rayong, to work in the sugar-cane fields during the peak season for labour between December and April. I was told that at least 10 villagers had worked in the sugar-cane fields each year. This work attracted the poor who needed to earn additional cash income after the harvest. The demand for labour on the sugar-cane plantations was very high during the sugar-cane harvest, which coincided with the slack season in the Northeast (Panpiemras and Krusuansombat, n.d.: 17). These migrant labourers were often contract labourers who received an advance from employers or middle men. Most labourers had worked for the same employers the previous year. The employers arranged vehicles, usually trucks, to transport the labourers from their villages to the cane fields. Some labourers brought their families (wives and children) with them to cook and help in the field. The cost of living in the sugar-cane and adjacent areas was extremely high. Since the migrants wanted to save as much as they could (their earnings ranged from 5,000 to 10,000 *baht* per family per year), they brought essentials with them. These

included a sack of glutinous rice (sufficient for the working period), salt, fish sauce, fermented fish, chilli, monosodium glutamate (MSG), dry tobacco or cigarettes, dozens of pain-killers, cooking utensils, and extra clothing. A simple shelter was usually provided free of charge so that the labourers could live close to the work place. Each family was allocated a separate bedroom, a cooking place (normally outside), and a shared toilet. They often supplemented their food by fishing, hunting, and gathering wild vegetables and bamboo shoots from nearby fields.

International labour migration began in the village early in the 1980s. In 1992, three village men had gone abroad for contract work - two to Singapore and the other to the Middle-East. One worker returned from Singapore two years later, after his contract finished, and applied for another contract in Taiwan. The villagers had been exposed to the idea of international migration since the Vietnam War in the 1960s and 1970s. Approximately 10 village women had moved to the provinces of Udon Thani and Korat to work as waitresses, or as 'rented-wives' or prostitutes near the United States' air force base. Four of those women later married American servicemen and migrated to the USA. After the Vietnam War, new tourist attractions such as Pattaya and Chonburi, and later Phuket, became popular destinations for village women involved in services and the sex industry. One village woman had been living in Germany with her German husband for nearly 10 years, and one man, who had undergone a sex change operation, married an Austrian man and had been living in Austria for three years. It was rather obvious that the larger modern-style houses in the village belonged to families in which a family member had worked or was working abroad.

The village served as the centre of Tambon Tha (the sub-district of Tha, a pseudonym), a group of 10 hamlets (*mu*) with a total population of 6,197 in 1991. The *tambon* headquarters located in the village included other local organisations, the *tambon* council, and the health centre. Administratively, the village consisted of two hamlets, Hamlet Two (*mu song*) and Hamlet Ten (*mu sip*), each under the care

of a *phu yai ban* (village headman). The headman of *mu song* also served as the *kamnan* (sub-district head).

In each hamlet, five to seven villagers served with the headman as a hamlet committee. This local political body consisted of relatives of the headman. The committee was subdivided into six sub-committees: the village elders, a temple committee, a financial committee, an educational committee of the school, a neighbourhood organisation, and a youth association. The hamlet committee functioned as a village development committee with the primary responsibility of advising the village leader. One villager was also chosen to be deputy headman (*phu souy phu yai ban*).

At the *tambon* level, the *tambon* council (*sapha tambon*) was a community political structure recently imposed by the central government. The council included two delegates from each hamlet plus the headmen, teachers, and chief health worker. This council was supposed to meet every three months with the district officer or one of his deputies for the purpose of guiding the improvement of the sub-district and administering public expenditure at the local level.

The two formal local leaders (*phu yai ban* and *kamnan*) were elected and then appointed by the government, receiving a minimal salary. They served the government at the local level and the people within their administrative sub-district. The *kamnan*, in particular, was responsible for a wider range of government activities related to community life, and his leadership was predominant in most extra-sub-district relationships. He was responsible for a monthly report on vital statistics at the lowest administrative level to higher level officials and also dealt with domestic affairs in the village. The *kamnan* was expected to sort out problems that could not be resolved at the hamlet level. The desired personal qualities for community leaders in Thailand include seniority, education, personality, hospitality, morality, and wealth. Wealth was a key quality among leaders in the study village.

In 1992, Sao, the *phu yai ban mu sip* was aged 52 and married with two daughters. He had finished *prathom si* (grade four), and was a Buddhist monk for

many years. He was the first headman of *mu sip* after the hamlet was officially separated from *mu song* in 1987. Generous, and respected by the villagers for his industriousness, he had been involved in many agricultural activities both for his own benefit and for that of the community. He seemed more interested in agriculture than in his role as *phu yai ban*. Besides owning 20 *rai* of paddy field and more than 50 *rai* of vegetable and fruit gardens, he also raised 10 head of cattle and nearly 100 chickens, as well as silk worms. When people wanted him, he was usually to be found on his farm two kilometres from the village.

The *kamnan*, Mai, aged 48 and married with two children, was one of the wealthiest men in the village. He finished his education to *prathom jet* (grade seven). Like the *phu yai ban*, he was interested in agriculture, as well as business. Apart from 40 *rai* of cultivated land, he owned a small rice-mill and a pig farm located in a village seven kilometres away. He spent most of his day in the rice-mill. He had just bought a brand-new pick-up which was used for both private and business purposes. He had been exposed to the outside world and the lure of urban life style and ideas through his work in towns, but previously he had not been in a position to follow such a life style. However, his role as *kamnan* gave him the opportunity to meet with high ranking government officials and businessmen from both the local and central areas and he and his family were quick to absorb new values and adopt an urban life style. His five-year-old modern house was equipped to accommodate visitors from town and he celebrated his birthday with a party, a rare event in rural villages. Guests from the village and nearby towns, most of whom were socially and economically better off, were invited.

Informal leaders were also respected and influential in the village. One of many outstanding informal leaders was 46 years old, Seup. His economic status had made him very influential in the village. One of the wealthiest residents, he owned a number of small businesses in the village, including a village store, a pig farm, a house construction business, and a car hire business. In addition, he had interests in rice growing and a cassava plantation. His 10 *rai* of paddy fields lay on a fertile plot

of land along the bank of the New Stream. He grew both glutinous and ordinary rice, but only for household consumption. His popularity in the village and neighbouring villages had involved him in local and national politics, and he helped to campaign for a political party in the village and surrounding areas.

As elsewhere in the Northeast, the villagers were predominantly Buddhist. Only three villagers professed Christianity. Buddhism was their way of life and Buddhist practices were well maintained. The function of villagers and *sangha* (Buddhist monks) were closely interwoven and interdependent. Both secular and religious village activities involved the *sangha* as representatives of Buddhism. The monks are invited to pray and speak at ceremonies such weddings, birthdays, funerals, and housewarmings. The *wat* (Buddhist temple) was open to anybody at any time for help or advice, and villagers contributed to the activities of the *wat.*

There were two *wat* in the village, the *wat ban* (village temple) and the *wat pa* (wooden temple). The *wat ban* belonged to the *Mahanikay* sect, and was located on the eastern edge of the village. Although the exact date of construction was not recorded, the *wat* was said to have existed for at least 50 years. In 1992, three monks and four novices, all of village origin, served in the *wat.* The abbot was one of the most senior leaders in the village, and was respected in the village as well as the district. He had served as a monk for more than 20 years. A few years earlier, his reputation had been tarnished by allegations of corruption, as he was said to have transferred *wat* money to his own account. No investigation of the allegation was undertaken and the village activities in the grounds of the *wat* continued as usual. These included fetching water from the *wat* ponds, presenting food to the monks, and attending the evening sermon.

Three kilometres southeast of the village stood the *wat pa.* Only one monk of the *Thamayut* sect served in the wooden *wat.* A native of the village, he received ordination in an eastern province, then wandered from place to place. The *wat* was built shortly after the monk passed through the village in December 1991. The villagers invited him to stay in the village and the new *wat* was built for him. After

the monk took up residence in the new *wat*, the woods surrounding the *wat* were well protected. Cutting down trees as well as hunting was prohibited. Because there was no water source in the *wat* area or nearby and the *wat* was far from the village, the villagers organised a rotating group to visit and present food and water to the monk each day. Meditation and the daily sermon were the main activities carried out at the *wat*. Those villagers, mostly old people, who were interested in these activities visited the *wat* daily. As the monk gained a good reputation for his behaviour and strict observance of the sangha order, villagers from other villages also visited him.

Most of the population depended on the village primary school which was located in *mu song*, next to the village *wat*. The school had long offered formal education up to *prathom si* (grade four) and expanded classes to *prathom hok* (grade six) to comply with the government policy to expand compulsory education in 1985. The school had just started to offer *muthayom nong* (grade seven) in 1992, enabling students in the village and adjacent villages to continue their education without leaving the village. Nonetheless, only 11 students in the village and six from nearby villages were enrolled for grade seven at the village school. Although about half those students who finished grade six continued their education, most were sent to schools in towns rather than to the village school. Some wealthy families even sent their children to schools in towns from kindergarten level. However, the children of poor families tended to leave school to help with domestic and farm work or to work for wages in order to support their families.

One classroom provided kindergarten classes for children aged five to six years, but the activities of the kindergarten class in the village school were rather limited because of the lack of teachers and funding. Neither a playground nor toys were provided, although each child was given a mat, a cup, and some books. The kindergarten children shared toilets and other facilities with the older students. Although the demand for kindergarten places was quite strong, it was not possible to

hold the class every year. In addition to the lack of staff and finance, insufficient children were enrolled in some years.

A school lunch program had been introduced by the Ministry of Education and operated by the teachers since 1986. When the program was first introduced, a village education committee consisting mostly of housewives had helped the school prepare food and clean up afterward. However, as time passed, community participation declined. When I visited the school, one teacher and a number of students (both boys and girls) were helping prepare food in the kitchen hall behind the school building, but no villagers were involved. The menu was planned one week in advance, and most of the ingredients were purchased from the village stores. Otherwise, the teacher in charge of the school lunch program had to purchase ingredients from a nearby town. Carbohydrate formed a major component of the lunch, usually in the form of noodles. Rice was not provided. Students paid one *baht* per dish and teachers paid two *baht* or more. Many students who ate the school lunch also brought a packed lunch with rice and sometimes grilled fish, chicken, or boiled eggs from home. According to the school principal, roughly half of the students depended on the school lunch. A few students took lunch at home during the lunch break. Food vendors, who paid 1,000 baht per year to the school, were also allowed to sell lunch in the school. Neither hygiene nor the menu were regulated by the school. Most of the food sold at the school was food usually eaten by villagers and containing little protein, such as fried noodles, *tom sum* (cold green papaya salad), varieties of noodle soup, and dessert with large amounts of sugar.

The school teachers in 1992 were concerned about the recent reduction in the numbers of the school-age children in the village. More than one 100 students had previously attended the school in 10 or more classes up to grade six. However, the number of school-age children had gradually declined over the previous decade and the number of students attending the school dropped markedly. In 1992, only seven classes were operating for a total of 86 students. Apart from fertility decline, another possible reason for the reduction in the number of school children was that

some children, particularly those from rich families, were being sent to school in towns since communications had improved and bus services had become available.

A majority of the adult villagers had only primary education. Very few had attended the secondary or tertiary levels. One villager had received a bachelor's degree in law from a government university in Bangkok but continued working in Bangkok after graduation. Ten villagers had degrees in teaching from teachers' college, but only three were working in the village school. One girl was attending a private university in management and business in Bangkok, and two girls were studying nursing at public nursing colleges in another province. Although many parents hoped their children would gain high levels of education, not many were able to afford to invest in secondary or tertiary education. As a consequence, a very high proportion of students left school after completing compulsory education.

Despite easy access to nearby towns and provincial cities, the traditional village way of life was maintained with some variation by most households, depending upon their socio-economic status. Most houses were one-storey wooden constructions with zinc roofs and raised on wooden posts about 5-7 feet off the ground. The verandah at the front, reached by a ladder-like stair also made of wood, was normally used for receiving guests, eating meals, and relaxation. One or two bedrooms occupied the rear portion of the house, while the cooking area or kitchen and bathing area were also at the back of the house. Under the house, animal enclosures were occupied by water buffalo, cattle, or pigs. Once a year, the animal pens would be cleaned and the manure taken to the paddy field or sold. Near the house, a wooden rice-store stood on wooden posts about the height of the house floor. Wealthy families, mostly along the road, lived in two-storeyed houses built with brick or cement, which had built-in bathing areas and toilets.

More than two-thirds of households in the village had some kind of toilet facility, and cement-slab flush toilets had been built for the school and the monks. The condition of toilets varied, depending upon the socio-economic status of the household. Latrines were normally built far behind the house, although a water-

sealed toilet, a jar of water, and a trash receptacle were installed in a small square enclosure in the bathing areas of some houses. Households without their own toilets shared toilets with relatives, but some villagers still defecated in the bush. The village did not have a drainage system or garbage collection. Each household was responsible for cleaning up and burning the garbage on their land. However, some households dumped garbage in public areas outside the village. Waste water and sewage were left to evaporate. This was practical for most of the year because the dry weather helped to evaporate water quickly. However, in the wet season rain water often lay about on the ground or in used tins or old utensils for some time, long enough to let mosquitoes breed and become a vector for dengue fever.

Fever was the most common illness among village children. The second most common type of sickness reported was related to nutrition and growth. Mothers always complained that their children did not want to eat or had lost their appetites. Diarrhoea, parasites, and dengue fever were also mentioned. Dengue fever had recently become common during the wet season and was considered to be a severe illness among young children. In 1990, a record number of cases of dengue fever occurred. Nearly 20 children from the village and neighbouring villages were taken to the health centre to be treated. Six who were severely ill were then referred to the provincial hospital for further treatment. However, there were no recorded deaths. Although diarrhoea was also common, the majority of the villagers viewed it as not severe unless a child had loose stools for more than three days. The most worrying cause of diarrhoea in young children who were still breast-fed was thought to be mothers eating foods that were prohibited during lactation. Thinness was another common health problem in children raising concern in the village. The villagers also call thinness *sang*.

For adults, the most common illness was pain such as back pain, waist pain, leg pain, pain all over the body, and headache. Pain-killers were often used for self-medication. The household survey of 66 households in the village found that nearly half of the households kept at least one kind of pain-killer at home. Medicine was

easily obtained from the village shops, health centre, or drug stores in the towns (see Chapter Three). Diarrhoea, parasites, fever, the common cold, coughs, and diabetes were among the common illnesses in the village. Health centre records showed that an epidemic of diarrhoea had occurred three years before my field work, but it had apparently not affected young children. Eighteen adults were afflicted and received intravenous infusion at the health centre, but no deaths were reported. This diarrhoea outbreak was believed to have been caused by food poisoning from eating noodles. Three school boys were taken to the health centre in February 1992 suffering from diarrhoea, but the cause was not known.

Parasitic infestation caused by liver fluke (*opisthorchis viverinii*) is widespread in the village, as elsewhere in the Northeast. According to the health centre record for 23 March 1992, 218 villagers had undergone stool examinations by a mobile laboratory team from the district hospital. The results showed that 38 villagers had liver fluke, 34 had hook worm, and two had both liver fluke and hook worm. These parasitic diseases, liver fluke in particular, can be caused by eating uncooked river fish. Most villagers still ate uncooked river fish. Opisthorchiasis was chronically manifested and was ultimately fatal if untreated. Due to the recent availability of medicine to combat opisthorchiasis, the disease was viewed as curable. Most villagers preferred to maintain their food habits and take the medicine rather than give up eating uncooked fish.

Diabetes (*bauvaan*) was of increasing concern. According to the health worker, eight villagers (five of them women) had been treated for diabetes at the district hospital. All were aged 50 years or above. Since diabetes is a chronic disease, patients required long-term treatment and regular visits to a diabetes clinic in the nearest hospital. However, some patients were unable to continue the treatment due to economic constraints. They turned to traditional treatments using herbal medicine, which was cheaper. Combined treatment was also practiced.

The villagers' day began early in the morning at around 5.30 to 6.00 a.m. Housewives or older children were responsible for the cooking; almost all the houses

depended on firewood or charcoal for cooking, and smoke rose from houses all over the village. Water buffalo and cattle would be taken by children or old people to the fields or the paddy field nearby to browse on the grass, and some villagers would hurry to the village stores to buy food, then return to their houses. Food vendors also would arrive in the village early and travel from house to house to sell food, while children gathered around the tube-well to fetch water before going to school.

Like most Northeasterners in rainfed areas, the villagers were farmers and agriculture was the mainstay of the economy. Glutinous rice was grown by almost all households. Rice was not viewed by most as a cash crop, but rather as the basis for feeding the family, with some surplus to be sold to purchase other necessities. Other cash crops, particularly cassava, provided additional income to more than half of the families. In addition, activities such as sugar-cane cutting, animal husbandry, silk production, lumbering, daily wage and contract labour, remittances from children working in towns, and salaries, in that order of importance, were other sources of cash income in the village. These activities will be described in the remaining part of this chapter.

Rice growing consumed more than half of a farmer's year. Soil preparation began right after the first rain during May when the land was ploughed and dikes repaired to retain rain water. The energy required for rice growing was either draft buffalo or, more recently, mechanical tillers. Nearly 20 families possessed mechanical tillers and two families had tractors, which were also for hire. The cost of hiring a power tiller was 100-150 *baht* per *rai*.

Seed beds were prepared when sufficient water was available. The rice seeds were broadcast into the prepared seed beds after soaking in water for three days. While waiting for the seedlings to mature around one-and-a-half to two months later, the second round of ploughing and harrowing was completed ready for transplanting the rice in July. The demand for labour was extremely high during transplanting, and all family members, except for young children and the old, worked

in the fields. Families whose members were working in Bangkok or other towns hired extra labourers to help in the fields.

After transplanting, farmers were engaged in weeding, spreading fertiliser, and draining or irrigating the rice fields. Fish, crabs, frogs, shrimps, and water vegetables were caught or gathered from streams or the rice fields for household consumption or sale in the village. However, the availability of food from these sources had declined due to heavy use of fertiliser. Upland cash crops were also grown while waiting for the rice to ripen. Harvesting took place in late November to December, another labour intensive period of hard work. To ensure that the harvested rice was not stolen and to save travel time for distant farms, one member of each family or sometimes the whole family would sleep in a temporary shelter built in the field. After threshing, the rice was carried to a rice store in the village by a truck or carts pulled by a pair of oxen.

Rice was mainly grown for household consumption and was only sold if in excess of household needs. However, some households were pledged to repay loans made before harvest at prices apparently lower than the market price. The rice could be sold either in the village to local traders or in the towns. An advantage of selling to the local traders was that no cost was incurred for transporting the rice, and the rice was usually collected by the trader. In 1992, rice sold in the village at a price of 35-38 *baht* per *tang* (10 kilograms) of rough rice. A local trader insisted that the offered price was even higher than in the towns. In towns the rice was sold by weight, often on scales that measured under true weight. The cost of transport to town was relatively high. In addition to the 11 *baht* bus fare from the village to town, an extra charge of 10-15 *baht* per sack of rice was levied. Nevertheless, most villagers preferred to sell their rice in towns and purchased necessities at the same time.

Bamboo shoot picking, silk worm and green papaya salad, local food in Ban Tha

The second crop, cassava, was viewed as an important cash crop by most villagers. Cassava was first introduced to the village about 20 years before as part of a crop diversification program. Since then it had replaced jute in most upland areas and the cultivated areas were expanding into the forests surrounding the village. As in rice production, modern technology had to some extent replaced the traditional ways. Using a draft buffalo for soil preparation was less common after tractors came to the village. The two owners of tractors hired in the village and surrounding villages were from the central provinces (Chonburi and Petchaboon), where farming was more commercial. Both had wives from the village. Fertiliser and chemical inputs were widely used to increase cassava production. Trunks of cassava were soaked in a special substance to stimulate growth. Villagers invested a lot of money and time growing cassava, from which they made between 3,000 and 20,000 *baht* per household per year. However, many villagers admitted that they did not profit from cassava farming, because of the relatively large investment. More importantly, because the price of cassava fluctuated on the world market, with a small land holding they could easily become insolvent.

Cassava growing started between January and March, after rice harvesting. Strong and healthy trunks of cassava were chosen from the previous harvest; fifteen to twenty trunks were tied up and kept in the fields. Some farmers purchased good quality cassava trunks from other villages as much as 30 kilometres distant. The trunks were cut into pieces five to six inches long for planting, which took place during the first shower of rain.

Apart from agricultural activities, villagers could significantly add to their income through daily wage work. Those who had finished the tasks in their own fields helped others for a wage of 50-70 *baht* per day (working hours from 8.00 a.m. to 5.00 pm.). Not only was the daily wage paid, but the noon meal was also provided since most villagers regarded the extra labourers as helpers. During a period with high demand for labour, such as rice transplanting, harvesting, and weeding cassava fields, labourers from nearby villages were also hired.

It was said that money sent home by children and other family members working in non-agricultural activities was an important source of cash income for many families in the village. However, the major part of the money was used to build new houses or repay debt. The money sent home usually did not cover household expenses because the migrants were engaged in unskilled labour, earning low wages. The lure of city life had a marked effect on their consumption behaviour, and in some months no money would be sent home. Therefore, other sources of income had to be sought for the families in the village. For the poor, seasonal migration to the central provinces to work in the sugar-cane plantation contributed substantially to cash income.

Wild or natural food resources had long been a major source of food for the villagers. However, due to the reduction in the area of upland forest around the village, food purchased in the market had become increasingly important. The natural foods gathered from the forest included wild vegetables such as bamboo shoots, mushrooms, and various kinds of leafy vegetables. Wild animals, such as ground lizards, frogs, insects, birds, and rats, were also abundant. Although the hunting of wild animals and gathering of wild vegetables were still part of village life, the quantity obtained had substantially decreased. It was said that the most marked reduction occurred after the forest was converted to a commercial eucalyptus plantation under the Royal Forestry Division of the Ministry of Agriculture and Co-operatives. Thousands of *rai* of forest were cleared to plant eucalyptus trees and neither timber cutting nor collection of firewood was permitted in these areas.

The paddy fields were another important source of food for the villagers. Not only rice was grown in the paddy field; plants such as shallots, cabbages, egg-plant, chilli, corn, peanuts, beans, cucumbers, and tomatoes were also grown after the harvest, either in the fields or the home gardens. Various kinds of water vegetables such as water cress, lilies, and others known only by their *Isan* names were also found in the rice paddies. Fresh-water fish and animals and a variety of shellfish grew naturally in the stream and rice fields, providing an important source

of protein during the rainy season. However, the use of chemicals such as insecticides and pesticides in rice and vegetable cultivation often destroyed these food sources. The adoption of new technologies coupled with the destructive effects of the changing environment had driven the villagers away from the traditional life style towards a more monetised way of life. More and more villagers were forced to work in non-agricultural activities and depended upon the market place for their food.

Commercial foods could easily be bought through village shops or food vendors. Twelve shops in the village sold all kinds of necessities such as matches, candles, nails, medicine, whisky, beer, ice cubes, fish sauce, MSG, salt, and fresh food. Some shop owners travelled to the towns daily to purchase fresh and cooked food. Fresh food, such as cabbages, chilli, eggplant, shallots, and limes, was bought from the wholesale market. Meat, such as pork, beef, chicken, and their derivatives, was also bought in small amounts. Preserved foods such as fermented fish, salted sea-fish, dry squid, and dry fish were sometimes purchased. The traders had to return to the village before 7.00 a.m. to sell their goods and food before breakfast. A village shop earned on average 200 to 400 *baht* (A$ 10-20) per day.

Three regular food vendors visited the village and surrounding villages daily to sell food door-to-door. All of them were of village origin but had moved to the district towns where they had been working as food vendors for more than three years. Only food, either fresh or cooked, and local sweets were sold. These foods were purchased from the district market at wholesale prices. Other food could also be ordered for the following day. The vendors arrived in the village before 5.00 a.m. by motorcycle with a bamboo basket loaded with food. They travelled from house to house to their usual customers, and from village to village. They did not use ice or refrigeration to preserve meat and other fresh food. On a good day, they were able to sell all their food by lunch time. On bad days, they were still wandering around until late afternoon, the leftover food deteriorating. Such food was often sold at a discount. Many villagers relied on the food vendors to feed their families

throughout the year and during heavy work periods in particular, when they did not have time to do housework. Most found occasionally buying cooked food a great convenience.

3.4 Summary

After three decades of implementing social and economic development plans towards industrialisation, Thailand has undergone many changes. The rapid pace of change in the previous decade brought about both direct and indirect consequences to individuals, families, and society as a whole. The positive side of economic development has not benefitted the majority of the population, particularly in the Northeast, while the negative impacts were pronounced. These included social and family disruption, income inequality, increasing cash economy, environmental problems and pollution, mass migration to congested areas in urban centres, and poor health. Infrastructure and facilities in the case study village had improved markedly in recent years. The improvements included road communications to neighbouring towns and villages, the health centre, the primary school, and other community organisations. Despite the presence of such facilities, the villagers still faced economic hardship, as well as poor health. The majority of the villagers continued to engage in agriculture in relatively small landholdings with heavy debts. Preventable diseases persisted and new health threats emerged. Problems such as deforestation, income inequality, poverty, mass migration, and poor health briefly discussed above are interlinked. The interrelationship of these complex issues will be further explored in the following chapters.

CHAPTER FOUR

Health services in Thailand and the case study village

> Improvement in health conditions will depend upon the most effective possible use of scarce resources in programs of scientifically proven effectiveness towards the most frequent and serious health problems. Non-physicians, personnel, back-up support for primary care workers, local financing, and community participation all appear to be essential to improving health conditions in the developing world... (Perry, 1988: 3)

As in most developing countries, the health conditions in Thailand stem from profound social, economic and political problems. Poverty, massive migration of the rural poor to urban centres, uneven distribution of health facilities and services, lack of basic necessities, a majority of the population being poor and living under unhealthy conditions, and sub-optimal planning and management all contribute to poor health conditions (ESCAP, 1987: 62; NESDB, 1987). Improvement in health in the developing countries is difficult. Curative care, long emphasised as the priority for health services, appears to have very little effect on the health of the people in rural areas, where poverty and poor living conditions are interlinked. Many public health specialists argue that the health of the poor can be effectively improved through simple, low cost, appropriate technologies and selective primary health care interventions including nutrition, maternal and children health, sanitation, and education (WHO, 1980; Walsh and Warren, 1980: 145; Perry, 1988: 3).

This chapter discusses the nature of health care services in Thailand and the case study village. Section 4.1 outlines the needs for health care services in Thailand, and Section 4.2 the condition of health care services. Section 4.3 reviews the nature of the health policy program. Section 4.4 deals with the health services system, while the patterns of utilisation of preventive health services identified in the TDHS data are described in Section 4.5. Section 4.6 focuses on health care facilities in the case study village including public health and nutrition programs implemented in the village. Section 4.7 concludes the chapter.

4.1 The need for health services

Equity in health care services was accepted as the main principle of primary health care on the grounds that health care is a basic need, and everyone has a right to health care (WHO/UNICEF, 1978). Each government has the responsibility to provide health care services for its population. However, health problems and health needs vary from one society to another. In Thailand, the major health problems arise from complicated and interrelated social, economic, cultural and political factors: high morbidity caused by infectious and preventable diseases among the poor in both rural and urban areas, a majority of the population being poor and living under unhealthy conditions, the uneven distribution of the existing health resources and services, and under-utilisation of the public health resources and services, particularly at the local level (WHO/ROSEA, 1985: 9-10; ESCAP, 1987: 62; Division of Health Planning, 1992). These issues are discussed in the following sections.

4.1.1 The persistence of high morbidity due to infectious diseases, malnutrition, and parasitic diseases, and the emergence of new health threats

Although the pattern of the cause of death has changed from poverty-related infectious and nutrition-related diseases to non-infectious diseases in the early 1980s, infectious and parasitic diseases remain the leading cause of morbidity among the Thai population, and the morbidity rates have increased over time (Division of Health Statistics, 1990: 211; Kachondham and Attig, 1992: 21). Table 4.1 summarises morbidity rates of out-patient attendances at the government health institutions between 1982 and 1990. Respiratory, digestive and parasitic diseases had increased in relative importance as causes of attendance at government hospitals and other health institutions. The morbidity rates of these diseases appeared to increase markedly over the period. The rate of out-patients with respiratory diseases increased from 100 per 1,000 persons in 1982 to 174.6 per 1,000 persons in 1990 and morbidity rates due to diarrhoeal diseases in 1982 and 1990 were 59 and 100 per 1,000 persons, respectively.

Table 4.1 : Morbidity rates of out-patients by 17 cause groups, Thailand, 1982-1990 (rate per 1,000)

Cause group	1982	1985	1990
1. Parasitic diseases	53.9	60.7	66.7
2. Neoplasms	1.8	2.2	2.9
3. Endocrine, nutritional and metabolic diseases	11.3	14.1	22.6
4. Blood and blood-forming organs	5.2	4.7	3.9
5. Mental disorders	15.1	16.4	21.1
6. Nervous and sensory organs	18.5	22.3	31.2
7. Circulatory system	11.6	14.0	23.1
8. Respiratory system	100.0	136.3	174.6
9. Digestive system	59.4	73.1	100.3
10. Genito-urinary system	17.0	21.2	27.2
11. Complications of pregnancy, childbirth and puerperium	10.5	11.1	7.3
12. Skin and sub-cutaneous tissues	24.4	30.7	39.3
13. Musculoskeletal system and connective tissue	15.3	22.8	38.8
14. Congenital anomalies	0.3	0.2	0.5
15. Certain causes of perinatal morbidity and mortality	2.3	1.6	1.4
16. Symptoms ill-defined	93.1	96.4	110.1
17. Accidents, poisoning and violence	34.9	39.8	58.0

Note: Information compiled from all provincial health offices under the jurisdiction of the Ministry of Public Health (excluding Bangkok) in the form of out-patient reports by groups of diseases or symptoms.

Source: Division of Health Statistics (1985, Table 2.5.2; 1990: Table 2.5.1, pp. 211-215).

The increase in morbidity rates may not necessarily indicate an increase in disease morbidity. It may reflect improvements in the reporting system and health service coverage that brings more people to be treated in the available health institutions. Although official health statistics and information are available in Thailand, it is believed that they are both incomplete and unreliable (Prasith-rathsint et al., 1986: 2). Not all sick people use public health services, which are highly concentrated in towns. Prasith-rathsint et al. (1986: 24) maintain that utilisation of health services by the Thai people is affected by various factors including the perception of health of both individuals and their relatives, social and economic background, as well as the nature and structure of health care services. Self-medication is widespread, and not all patients seek help from the health institutions.

Despite these limitations, official statistics do give some indication of the general nature of health problems and trends over time, which need to be addressed.

Morbidity varies by region. In 1990, nearly 18 million people in Thailand as a whole (excluding Bangkok) were diagnosed as having one or more of the three major types of disease. Of those, seven million people were from the Northeast (Division of Health Statistics, 1990: 211). Morbidity rates due to parasitic and digestive system diseases were most prevalent in the Northeast, with rates of 78 per 1,000 persons and 115 per 1,000 persons respectively (see Table 4.2).

Table 4.2 : Morbidity rates and numbers of out-patients by cause of disease for the three leading causes by region, Thailand, 1990

Diseases	Rate per 1,000 persons				
	Central	North	South	Northeast	Overall*
Parasitic diseases	58.7 (681)	54.4 (732)	72.3 (538)	78.0 (1,479)	66.7 (3,430)
Respiratory diseases	195.3 (2,267)	166.5 (2,239)	188.4 (1,401)	162.1 (3,076)	174.6 (8,983)
Digestive system diseases	98.4 (1,142)	91.8 (1,235)	80.2 (597)	115.4 (2,190)	100.3 (5,163)
Total number of cases	4,090	4,206	2,536	6,745	17,577

Notes: 1. Figures in parentheses are the number of cases (in thousands).
2. * Excludes Bangkok.
3. Causes of diseases are classified into 17 cause groups (see Table 1). However, only the three leading causes of diseases are presented in this table.

Source: Division of Health Statistics (1990: Table 2.5.1, page 211).

The nutritional status of a population, particularly among the preschool age children, is considered an important health indicator. In Thailand, even though the aggregate levels of malnutrition have improved considerably, regional differences remain marked. The Northeast has the highest rate. Before 1980, the prevalence rate of protein energy malnutrition (low weight-for-age) among preschool children in the Northeast was over 50 per cent. This has gradually declined, only 17 per cent of children being malnourished in 1991. In 1989, the highest rate of malnutrition

among preschool children was in the Northeast (26 per cent), while the comparable figure for the Central region was only nine per cent (Table 4.3).

Table 4.3 : Nutritional status of preschool children by region, Thailand, 1989 (percentage)

Region	Nutritional status (percentage)			
	Normal	Mild	Moderate	Severe
East	90.53	9.17	0.03	0.00
Central	91.03	8.80	0.17	0.00
North	80.07	18.70	1.21	0.02
South	83.94	15.34	0.71	0.01
Northeast	74.14	24.69	1.17	0.00
Whole Kingdom	80.20	18.88	0.91	0.01

Note: The classification of nutritional status is based on the Thai reference of body weight as a percentage of standard weight and the cut-off points are normal (90 per cent and above), mild (75-89 per cent), moderate (60-74 per cent), and severe (below 60 per cent).

Source: Division of Nutrition, Ministry of Public Health (1992).

Other infectious diseases affect the health of the Thai people (Nittayarumphong et al., 1991: 36-37). These include viral hepatitis (7-11 per cent of Thais are hepatitis B carriers, accounting for 4-5 million people), dengue haemorrhagic fever (161,339 cases in 1987, with the highest prevalence in the Northeast), and recently, the AIDS epidemic which has seriously threatened the health of the Thai population. While infectious and parasitic diseases persist, particularly among the poor, degenerative and non-infectious diseases have also emerged as health problems. In the 1980s and 1990s, cardio-pulmonary diseases, accidents and poisoning, and neoplasms have taken over as the three leading causes of death. Statistics also have shown an increasing trend of diabetes mellitus, hypertension, obesity, mental illness, drug addiction, and other substance abuse (Kachondham and Attig, 1992: 21).

4.1.2 Prevalence of poverty and lack of clean water supply and sanitation

Despite three decades of development and the unprecedentedly high rate of economic growth during the 1970s and 1980s, a majority of the Thai population in rural areas and many in urban areas have remained in abject poverty. The gap in

income and living standards appears to have worsened (Bangkok Post, 1988: 28; Thailand Development Newsletter (TDN), 1990: 96; Gohlert, 1991: 9; Fairclough and Tasker, 1994: 22). Income and living conditions vary between cities and villages and across regions. In the period 1981-1990, average monthly household income in the Northeast, where one-third of the population live, increased only marginally, but doubled in the capital city (Table 4.4). In 1990, the average monthly household income of 3,563 *baht* in the poorest region, the Northeast, was less than one-third of the income of 11,344 *baht* earned by people in the capital city. The 'trickle-down' policy has failed to benefit the majority of Thais, particularly those in the Northeast.

Table 4.4 : Population and monthly household income and expenditures (*baht*) by region, Thailand, 1981 and 1990

Region	Population (1,000)[a]	Income 1981[b]	Income 1990[c]	Expenditure 1981[b]	Expenditure 1990[c]
Bangkok	6,396	5,972	11,344	5,737	10,386
Central *	12,061	3,665	6,060	3,795	5,931
North	10,908	2,886	4,553	2,555	3,854
Northeast	19,450	2,512	3,563	2,782	4,500
South	7,523	3,256	5,023	3,343	4,943
Whole country	56,338	3,378	5,621	3,374	5,521

Notes: 1. * Excludes Bangkok, Pathomthani, Nonthaburi, and Samutprakarn.
2. 1990 population estimation.

Sources: [a] Division of Health Planning (1990:). [b] National Statistical Office (1981: 1, 22). [c] National Statistical Office (1990: 7, 23).

Household infrastructure has improved over time even in the Northeast, but regional variation remains marked. The national coverage of clean water supply increased from approximately 16 per cent of households in 1977 to 74 per cent in 1987. Availability of toilet facilities also increased substantially from 34 per cent to 62 per cent (Nittayarumphong et al., 1991: 39-40). However, piped water was the main water supply in Bangkok (88 per cent), but less than 20 per cent of the households in the Northeast had access to piped water (Table 4.5). More than three-quarters of the households in the Northeast still relied on tap and well water.

Table 4.5 : Household source of water supply and sanitation by region, Thailand 1990 (Percentage)

Characteristics	Bangkok	Central	North	Northeast	South	Total
Water supply						
Piped inside	85.5	30.6	26.4	15.3	17.8	31.7
Piped outside	1.2	3.2	2.0	1.1	0.3	1.6
Public tap-well	1.6	47.1	64.3	76.7	75.8	56.8
River or stream	11.3	17.0	5.7	3.6	3.3	7.7
Rain	0.4	0.7	0.4	1.2	0.8	0.8
Others	..	1.4	1.2	2.1	2.0	1.4
Drinking water						
Piped inside	60.7	12.3	21.2	3.9	12.9	19.2
Piped outside	2.7	2.7	1.4	0.6	0.6	1.5
Public tap-well	0.4	23.2	57.7	44.4	66.0	39.3
River or stream	0.8	2.6	3.4	0.1	2.0	1.6
Rain	18.9	54.4	13.4	48.5	12.8	33.0
Others	16.5	4.8	2.9	2.1	5.7	5.4
Toilet facilities						
Flush private	67.3	78.9	76.3	68.5	56.0	70.4
Flush shared	32.0	10.0	10.4	6.5	6.0	11.9
Other type	0.4	3.6	3.0	0.3	6.5	2.3
None	0.3	8.1	10.3	24.6	30.5	15.4

Note: * Includes Bangkok, Nonthaburi, Pathomthani, and Samutprakarn.

Source: National Statistical Office (1990: Table 1, pp. 12-14).

Poverty is undoubtedly a major cause of poor health and the ability of the poor to finance health care is extremely limited. In Thailand, only one-third of the total health care expenditure is financed by the government (Khoman, 1991: 5; Griffin, 1992: 56; Division of Health Planning, 1992: 48). The share of private health expenditure (entirely supported by households) has increased over time, from 61 per cent of total health expenditure in 1977 to 71 per cent in 1986 (Khoman, 1991: 7; Griffin, 1992: 120). In her study on household choice of health care providers in Thailand, Khoman (1990 cited in Khoman 1991: 7) found that the poor were more likely to buy drugs for self-treatment than the higher socio-economic groups. Overall, drug purchases increased about four-fold between 1976 and 1987, while medical care expenses increased only slightly more than two-fold in the same period. The National Statistical Office (1988: 5-6) Household Socio-economic Survey revealed that in 1988 3.5 per cent of monthly household expenditure went to medical care for the Northeast region as a whole. Rural households spent less

money in real terms on medical care, but a greater percentage of household income than urban households (Table 4.6).

Table 4.6 : Summary of monthly household expenditure on medical care by administrative units, Northeast Thailand, 1988 (*baht*)

Expenditure	Municipal areas	Sanitary areas	Villages	Whole region
Drugs and other medicines				
Pain-killers	9	11	14	13
Antibiotics	4	1	2	2
Traditional drugs	3	1	3	2
Others	18	16	11	13
Medical services	108	105	74	79
Total medical care	142	135	104	109
	(2.5)	(3.0)	(3.8)	(3.5)

Note: Numbers in parentheses are percentage monthly household expenditure on medical care.

Source: National Statistical Office (1988: Table 1, pp. 5-6).

Public health policy has emphasised expansion of rural health services and preventive care in the services offered by local health facilities with most of local expenditure going to waste disposal, water supply, immunisation, and other forms of preventive care (Khoman, 1991: 5). Nevertheless, nearly 60 per cent of the total public health budget went to secondary and tertiary medical care (Division of Health Planning, 1992: 55).

4.2 Condition of health services

Two crucial problems associated with health services in Thailand are discussed in this section: uneven distribution and under-utilisation of health care facilities and services.

4.2.1 Uneven distribution of health facilities and services

Despite efforts by the government to narrow the gap between Bangkok and the rest of Thailand, health facilities and services are unevenly distributed. Scholars have argued that government management and policy are the major causes of

inequality in health care allocation (Bowornwathana, 1984: 40; Wiwat et al., 1986: 36; Gohlert, 1991: 111).

Since the late 1970s, the numbers of health care institutions (district hospitals and health centres) and personnel (physicians, nurses, midwives, village health volunteers and communicators) have markedly increased. For example, the number of district hospitals increased from 341 in 1970 to 558 in 1987, covering about 80 per cent of all districts (705 districts) in 1987. The number of health centres increased from 5,761 to 7,542 in the same period. The number of health personnel has also increased considerably; approximately 3,528 physicians were added to the health services between 1982 and 1988, and the number of nurses doubled to 49,295. The numbers of modern trained midwives also doubled to 11,354 between 1982 and 1989 (Alpha Research, 1992: 124).

The expansion in the number of health institutions and personnel is impressive. However, the distribution of health services in the various regions must be also taken into consideration. Table 4.7 summarises the distribution of selected health personnel and the ratio of population to health personnel by region during the period 1982-1988. The distribution is particularly uneven between Bangkok and the rest of Thailand. Although the distribution of health personnel improved substantially, the bulk of health personnel (physicians, dentists, pharmacists, and nurses) worked in the capital city.

The population ratios for all major types of health personnel are biased towards Bangkok. In 1988, one physician served a population of 1,258 persons in Bangkok, but each physician served 10 times that number in the Northeast. Dentists and pharmacists were particularly in short supply; only 1,958 dentists and 4,238 pharmacists were officially registered for the whole nation in 1988. Each dentist served more than 80,000 people, and each pharmacist served nearly 60,000 people in the Northeast, while the population in Bangkok covered by each dentist and pharmacist were 5,042 and 2,097 respectively. The number of trained nurses

increased markedly over the period in all regions, but the population covered by each nurse was largest in the Northeast.

Table 4.7 : Government health personnel and population ratios by region, Thailand, 1982-1988

Type of personnel	Percentage			Population ratio		
	1982	1986	1988	1982	1986	1988
Physician						
Bangkok	54	45	43	1,348	1,577	1,258
Central	16	18	17	7,958	8,444	9,141
North	13	13	15	10,479	9,227	6,398
South	7	10	9	10,680	7,080	6,942
Northeast	10	14	15	23,950	13,564	11,254
Whole kingdom	100	100	100	6,406	5,739	5,422
	(7,658)	(9,255)	(11,186)			
Dentist						
Bangkok	60	63	52	7,710	7,399	5,042
Central	15	16	19	52,705	47,154	48,043
North	13	9	11	65,005	86,556	49,925
South	5	5	7	99,410	102,435	51,964
Northeast	7	7	11	217,617	192,000	84,406
Whole kingdom	100	100	100	40,146	38,077	30,976
	(1,247)	(1,395)	(1,958)			
Pharmacist						
Bangkok	84	82	69	2,132	2,144	2,097
Central	6	6	9	56,270	48,663	46,782
North	5	5	10	60,988	65,253	52,905
South	2	3	5	92,308	62,270	18,953
Northeast	3	4	7	178,719	140,268	59,644
Whole kingdom	100	100	100	15,848	15,828	14,311
	(3,097)	(3,356)	(4,238)			
Nurse						
Bangkok	47	32	28	517	450	443
Central	19	22	24	2,242	1,099	1,532
North	14	15	17	3,144	1,627	1,795
South	9	12	12	2,864	1,235	864
Northeast	11	18	19	6,806	2,471	2,001
Whole kingdom	100	100	100	2,154	1,297	1,230
	(22,870)	(40,952)	(49,295)			

Notes: 1. Figures in parentheses are the number of health personnel for each category.
2. The figures in this table were calculated from Division of Health Planning, 1992: Table 23, p. 50.

These highly trained health personnel (physicians, dentists and pharmacists) were most likely to work in hospitals and health institutions, which are highly concentrated in towns and areas and provide curative services. Health centres at the community level were staffed by two to three paramedicals who had received less than two years of formal training. These health centres, which often lacked facilities

and equipment, provided integrated curative, preventive and promotive care to the population under their jurisdiction (a cluster of about 10 villages). At the village level a participatory approach has been adopted. One village health volunteer (VHV) and about 10 village health communicators (VHC) coordinate and provide health care for simple diseases to their neighbours. The quality of health care provided by the different personnel and health services differs widely. Often local health facilities in rural areas lacked not only qualified health personnel, but also other facilities such as medicine, equipment and funding.

4.2.2 Under-utilisation of the existing public health resources

Local health facilities in Thailand are undeniably under-utilised. Rural residents and urban poor use a combination of traditional and western forms of health care (Sermsri, 1989: 176). However, only the scientific methods of western health care have been accepted and promoted by the government (Archananupab, 1987: 13; Wibulpolprasert, 1987: 3; Sermsri, 1989: 163). Western health care provided by both public and private sectors through hospitals, clinics and drugstores has dominated health services in the cities. Qualified health providers of all kinds are also concentrated in these high-level health facilities (Quah, 1989: 183; Sermsri, 1989: 163). In contrast, only one or two staff who have received one-and-a-half years of training provide modern health services to a population of 5,000 at the local level (Krongkaew, 1982: 79; Division of Health Planning, 1992: 58).

Although modern health services are provided by local health facilities in many rural subdistricts, utilisation of these health facilities remains very low. The national survey of health utilisation in Thailand by the MOPH (1978: 45) revealed that only four per cent of people made use of health centres in 1970. The comparable figure for government hospitals was 11 per cent and for self-medication a high 51 per cent. However, it cannot be concluded that modern medicine was unpopular, since about 23 per cent of the population used private hospitals and clinics. Why are public health facilities, both hospitals and health centres, under-utilised?

Surveys conducted in 1979 and 1985 revealed marked increases in the utilisation of government health facilities (Table 4.8). Almost one-third of the population used public hospitals in 1985, which was higher than the utilisation of private hospitals and clinics combined. The expansion of modern public health facilities to local communities in recent years may have improved acceptance and utilisation of public sector modern health services. However, only the high-level government health services in urban centres were widely used, while local health centres and paramedical services were still under-utilised. The utilisation rate for health centres actually fell between 1979 and 1985. Many people seem to have by-passed the government health centres to attend hospitals at district and provincial levels. This may be partly due to the relatively poor care at the sub-district levels, together with a shortage of health personnel. Problems of resource allocation in the health sector result in over-utilisation of high-level health facilities. There are often long lines of clients at the provincial and teaching hospitals where people expect to receive better medical and health care services from highly trained health personnel, while health centres are left empty.

Table 4.8 : Health services utilisation in Thailand, 1970, 1979 and 1985 (percentage)

Source of health care	1970[a]	1979[b]	1985[c]
Take no medicine	2.7	4.2	6.3
Traditional practitioners @	7.7	6.3	2.4
Self-treatment and self-medication (medicine bought at drugstores)	51.4	42.3	24.4
Government health centres	4.4	16.8	13.3
Government hospitals	11.1	10.0	32.8
Private clinics and hospitals	22.7	20.4	20.8
Total percentage	100.0	100.0	100.0
Total number	2,986	4,660	5,850

Notes: 1. The use of health services refers to the month (30 days) preceding the interview.
2. @ includes injectionists.

Sources: [a] Ministry of Public Health (1978) (in Thai)
[b] Ministry of Public Health (1982) (in Thai)
[c] Institute for Population and Social Research (1987) (in Thai)

The over-utilisation of high-level health care facilities is argued to be partly due to the 'cross-the-board' type allocation of the public health resources (Khoman, 1991: 7). On the demand side, psychological factors also play a significant role in the choices of health care facilities. Sermsri (1989: 168) stresses that the main problem is related to social and opportunity cost:

> There are many stories of patients being treated very poorly by modern government health practitioners but ... welcomed by private doctors, although both types of modern health providers are the same in terms of levels of professionalism and efficacy. Some of the social costs that patients have to bear are waiting time, time absent from work, time spent in consultation and treatment, and difficulty in communicating with modern health providers ... The bureaucratic red tape characteristic of the government health services adds further to the high cost of modern health care facilities.

4.3 Health programs and policies

The national health policies have been implemented in the framework of five-year national economic and social development plans since 1961. The national health plans have been formulated by two government organisations, the Health Committee of the MOPH and the Social Planning Committee of the National Economic and Social Development Board (NESDB). The Health Committee, consisting of top executives in the MOPH, is responsible for formulating overall national health priorities and policies, while the Social Planning Committee is responsible for planning and coordinating all health projects proposed by the MOPH in line with other national development policies. Thailand has had seven five-year plans; the seventh five-year plan (1992-1996) is presently being implemented.

Equitable health care is still a goal in Thailand, but the public health service is regarded by many as not very effective (Chanawong, 1989: 11; Gohlert, 1991: 111). Government health services have been highly centralised and have tended to emphasise curative care. Many health institutions were built in Bangkok and other cities, while the majority of the population in rural areas had no access to basic services (Suthapreeyasri, 1988: 58). Only in the late 1970s did the government recognise the failure of previous health strategies to improve the health and well-being of the majority of the population. A new direction of health policy emerged

in response to increased pressures from international health organisations (ESCAP, 1987: 62; Sermsri, 1989: 169), and lobbying by prominent officials within MOPH (Cohen, 1988: 166). The emphasis changed from a curative orientation to family planning and the recent movement to primary health care in order to achieve the goal of health for all.

The first five-year plan (1961-1966) emphasised the economic aspects of development, especially the provision of large-scale infrastructure such as roads and hydro-electric dams. The social aspects of development, including health, received very little attention. Most of the budget was used to build hospitals, health centres, and midwifery stations and to increase the number of high level medical personnel such as doctors. However, the provision of health care facilities and services was largely confined to urban areas, while rural people still had poor access to such health services.

During the second health plan (1967-1971), the government began to realise that health was one of the important aspects of social and economic development that needed to be developed alongside other national development policies. Although the construction and expansion of health care services still dominated the health plans, the emphasis shifted towards making them more responsive to rural demand. The health system was reorganised to administer integrated curative, preventive, and promotive health care services.

The third five-year plan (1972-1976) shifted the emphasis to the family planning program. Although the government had officially supported the family planning program in the early 1970s, it was documented that a program for providing contraceptives as part of health plans occurred as early as the late 1960s (Knodel et al., 1980: 92; Rosenfield et al., 1982: 43). The plan had been influenced by international organisations such as UNFPA, USAID, Population Council, WHO, UNICEF, and the World Bank in recognising the negative impact of rapid population growth on development. Effective birth control programs were provided for specific target groups in order to bring down the high population growth rate,

which at that time was over three per cent per annum. A health development committee was also set up in each sub-district, consisting of the sub-district chief, a village headman, an abbot and other community representatives. However, their impact was limited.

The fourth plan (1977-1981) aimed to strengthen the family planning program to cover a wider range of target groups and to provide more effective contraceptive methods. Family planning became the dominant consideration in the work of health policy implementors at all levels.

Despite government efforts, the health components in the national economic and social development plans from 1961 had very little effect on Thai society and even less on the rural population (Bangkok Bank, 1973 : 686; Goldstein and Donaldson, 1979: 324). Many of the shortcomings in health services and distribution could be attributed to problems in the planning and management of the policy. Chanawong (1989: 11) argued that development had emphasised economic growth and had failed to recognise the social and health aspects of development.

By the early 1980s, critics were asserting the need for a different approach. For example, Smith (1982: 523) asked:

> (1) Is there a need to reorder health priorities in a manner that would (a) reduce stress on expensive medical technology and limit the training of highly skilled doctors, and (b) increase emphasis on preventive and promotional medicine; (2) should indigenous systems of medicine be officially recognised and utilised by the Ministry as recommended by the World Health Organisation?

A new direction was adopted during the fifth plan (1982-1986), due partly to the influence of international organisations, such as WHO, UNICEF, and the World Bank as well as the internal forces from the MOPH and lobbying groups. The government realised that the previous plans had failed to meet the demand for health of the population at large, particularly those in rural areas. The new health policy aimed to achieve 'health for all by the year 2000' by providing health care to the rural people through popular participation and mobilising local resources in the form of village health communicators (VHC) and village health volunteers (VHV), with government financial and technical support. The role of health personnel changed

from that of the 'providers' of health services to the 'promoters' or 'supporters' of community participation in health development and in developing community self-reliance at least on 'basic minimum needs'. Another major step taken by the MOPH was to establish a new division, the Primary Health Care (PHC) division to coordinate, organise, and support activities. However, the MOPH did not undertake any major organisational reforms at the provincial level.

At present, the national health objective is to strengthen primary health care through popular participation and government budgetary and other support, to expand health facilities at the district, sub-district and village levels in order to ensure an acceptable quality of health services for the rural population. Family planning, although still important, is considered within the framework of 'integrated health care services'. Such health activities aim to prevent diseases and promote health in the areas of nutrition, maternal and child health, family planning, dental health, and environmental health. Since the 1980 change in health policy, the number of government health facilities in rural areas (district hospitals, health centres and health volunteers) has increased impressively.

The sixth five-year plan (1987-1991) continued to follow the principles of PHC. It adopted the basic minimum needs approach and the principles of social justice and self-reliance for individual, family, and community. The sixth plan also promoted decentralisation of health administration by increasing the role of people in decision making, particularly regarding problem identification, need assessment, strategy formulation and resource management.

The seventh five-year health plan (1991-1996) extended the activities of the sixth plan. It contained the following elements (Division of Health Planning, 1992: 75-76): support for community efforts in rural and urban areas to expand PHC; upgrading the public health services delivery system in terms of infrastructure, referral systems and technical support systems; improved access to health services for low-income groups, labourers (both in Thailand and abroad), the elderly, children, the disabled, and disadvantaged people; increasing efficiency; strengthening

human resource planning as well as personnel management; strengthening and development of new models and approaches to disseminate health information; promotion and development of innovations in the application of technologies for health research and development; and revision of existing laws and regulations.

Since the fifth five year plan, health care facilities have improved markedly, particularly at the peripheral level. For example, in 1987, nearly 80 per cent of the 705 districts had district hospitals, and 7,542 health centres were located in 6,485 subdistricts (MOPH, 1988). The coverage of health volunteers (VHV and VHC) had also increased substantially from about 90 per cent of villages in 1985 to nearly all in 1990 (Nittayarumphong et al., 1991: 58). Sixty per cent of villages had established drug cooperatives (Division of Health Planning, 1992: 43).

Despite the increase in the number of health facilities, their quality remains an issue. Sermsri (1989: 170) noted that popular participation had strengthened the coverage of the government health services and bridged the physical and social gaps between the needy and the health providers. However, in a study of alternatives to primary health care volunteers in Thailand, Hongvivatana et al. (1988: 48, 55) noted that the turn-over was extremely high (42-60 per cent for VHCs and 25 per cent for VHVs each year). Of those who remained in service, only 26 per cent were actively performing their activities. Their main work involved curative care, while promotive activities received less emphasis. Wiwat et al. (1986: 36) also argued that selective rather than comprehensive approaches of government-sponsored PHC ignore the fundamental social, economic, cultural and environmental causes of the health problems.

4.4 Structure and organisation of the health service

This section describes the administration and structure of the public health services, at the central and local levels. The private sector in Thailand is mainly concentrated in urban centres, and tends to emphasise curative rather than preventive care through private clinics, hospitals, and drugstores. Informal traditional health care services are also available throughout the country, particularly in rural areas. Although traditional healers are considered by many to be unscientific, they remain an important alternative source of health care in Thailand. This section describes how these three health areas are organised. Issues and conflicts related to the provision and utilisation of these health services are also addressed.

As in most developing countries, the health service system in Thailand is a dual system of traditional and western health care. The western health service is characterised by the coexistence of public and private sectors, while the traditional methods of healing are entirely in the hands of private sector. The Ministry of Public Health (MOPH) dominates the provision of western health services through its network of public health resources. Apart from the MOPH, other government health-related agencies including the Office of Prime Minister, the Ministry of Interior, the Ministry of Agriculture and Co-operatives, the Ministry of Science and Technology, the Ministry of Industry, and the government Pharmaceutical Organisation are involved in health services. Three organisations of the Office of the Prime Minister are directly involved in health planning, including the Budget Bureau, the Civil Service Commission, and the National Economic and Social Development Board (NESDB). The last is responsible for overall development planning and approval of sectoral plans in accordance with government policy.

4.4.1 The public health sector

The Ministry of Public Health (MOPH) is the part of the Thai bureaucracy responsible for delivering public health services in the country through a centrally-controlled hierarchical network of public facilities at the central, provincial, district, and sub-district levels. In 1990, half the total number of physicians, 40 per cent of

the dentists, one-third of the pharmacists, 70 per cent of the nurses and 90 per cent of the midwives working in Thailand were employed by the MOPH (Division of Health Statistics, 1990: 229-232). These public health providers staff government health institutions (hospitals and health centres) at all levels, providing both preventive and curative health services throughout the country. The MOPH consists of two main offices and four departments, with a total of 83 divisions. The health administration can be divided into two levels: the central and the provincial health administration.

The central health administration. The MOPH is organised into six main components: the Office of the Permanent Secretary, Department of Medical Services, Department of Health, Department of Communicable Diseases Control, Department of Medical Science, and the Office of Food and Drug Committee. The Office of the Permanent Secretary is the largest organisation responsible for policy and planning, manpower development, and health administration. In addition, it directly supervises and controls regional hospitals and the provincial health administration. The Department of Medical Services is a technical support department for non-communicable diseases, controlling some large general and specialised medical institutions located in Bangkok. The Department of Health is mandated to support the provision of preventive and promotive health care at the provincial level. Eight divisions provide technical support, including dental health, rural water supply, nutrition, sanitation, family health, school health, environmental health and occupational health. Nutrition activities are carried out at the local level by sub-district health personnel and health volunteers. The Department of Communicable Diseases Control is responsible for technical support dealing with venereal diseases, AIDS, malaria, general communicable diseases, filariasis, leprosy, and tuberculosis. The Department of Medical Science has prime responsibility for conducting medical research and supporting laboratory services. The Food and Drug Committee has five divisions dealing with cosmetic control, drug control, psychotropic substances control, and food and beverage control.

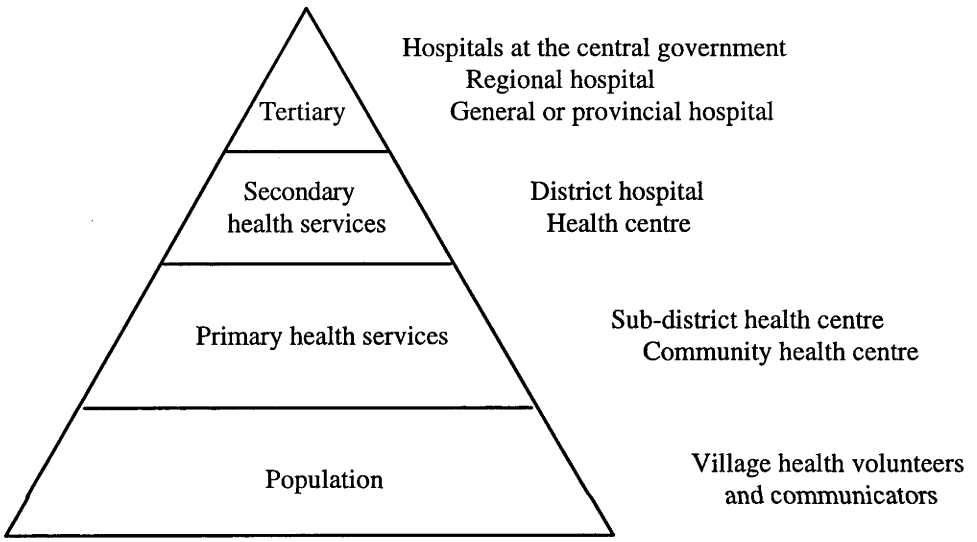
The provincial health administration is divided into two sub-levels: the provincial level and the district (rural) level. At the provincial level, the Provincial Health Office (PHO), headed by the Provincial Chief Medical Officer (PCMO), is responsible for providing health services within its jurisdiction under the direct supervision of the Office of the Permanent Secretary, MOPH. The PHO consists of eight sections including administration, planning and evaluation, health promotion, communicable diseases control, environmental sanitation, health education, training and supportive services, medical services, and dental health section. Two sections (administration, planning, and evaluation) are directly administered by the PCHO, the others are under the administration of the Director of the Public Health Technical Office. In addition, regional hospitals situated in the provinces and provincial hospitals are under the administration of the PCHO.

Rural health care services. Two public agencies, the district hospitals and district health offices, are responsible for administering and providing health services to the people within the district. Both agencies are under the supervision of the PHO. The district officer directly administers the health centres located in sub-districts.

In 1987, the MOPH (Sudsuk, 1987 cited in Suthapreeyasri, 1988: 151) redeveloped the health services system. Health care has operated through a hierarchy of facilities, namely village health volunteers and communicators, primary health facilities, secondary health facilities, and tertiary health facilities (see Figure 4.1). Each level provides health services to a defined population group. The health services at the top level include specialised medical care using advanced medical technology and highly trained health providers in provincial hospitals, regional hospitals, teaching hospitals, and specialised clinics and institutions in Bangkok. The key health facilities providing modern health care at the second level are a district hospital staffed by at least one physician with other health staff. Formal health care services at the primary level are provided by appointed paramedical staff (midwives and junior sanitarians) allocated to the lowest public health units, the health centres.

Health services at this level integrate preventive, curative, promotive, and rehabilitative care. At the village level, local resources have been mobilised to utilise simple and appropriate technology. Village Health Volunteers (VHV) and Village Health Communicators (VHC) are the key facilitators at the lowest level of the health care hierarchy.

Figure 4.1 : Hierarchy of public health care services



Source: Modified from the framework developed by Sudsuk (Suthapreeyasri, 1988, Figure 7, p. 151).

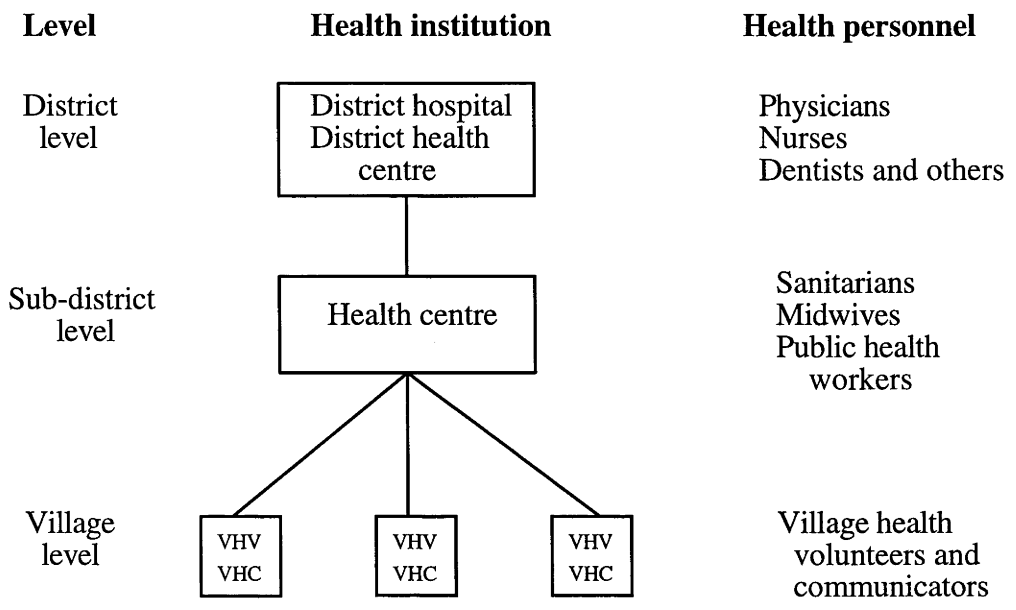
Primary health care (population level). The Primary Health Care (PHC) system was launched by the MOPH in 1977, but it took almost two years for the government to approve PHC as the official national health policy in March 1979 (ESCAP, 1987: 64). The government PHC program is based on integrated rural development, orientation of PHC to local community needs, and popular participation, the utilisation of local resources, and the extensive use of suitably trained local health workers (Cohen, 1989: 166). A new program entitled 'quality of life' has also evolved under the auspices of the four principal ministries concerned with development (Interior, Education, Public Health, and Agriculture and Co-operatives). A list of basic minimum needs and minimal goals was drawn up and the

government agreed to provide some assistance, including consultancy, technology, and limited financial support (Gohlert, 1991: 52).

According to the PHC framework, each village consists of one VHV and VHC. VHCs are selected by about 10 households. After five days of training on specific aspects of nutrition, hygiene, immunisation, and prevention of communicable diseases, the VHCs will function as health communicators to pass health information on to their neighbours. VHVs are selected from the VHCs and given an additional fifteen days training in the treatment of common ailments, first aid, family planning services, and household medicine. VHVs are responsible for organising immunisation, administering first aid, and dispensing basic drugs, as well as assisting health centre officials to transmit health information to and from the villagers. This hierarchical network of VHV, VHC, and health centre forms the core of the PHC program in Thailand (see Figure 4.2). The government has also introduced drug co-operatives at the village level, which are supervised by a VHV. Village households buy shares (at 10-20 *baht*) in the cooperative which purchases basic drugs from the government hospitals or pharmacies at the wholesale price and sells them at official retail prices. The profits are then used to buy more supplies (MOPH, 1988: 61). The success of the drug fund has led to the establishment of other funds such as sanitation, water, and nutrition (MOPH, 1988: 61-68; Hongvivatana et al., 1988: 35-38).

It was hoped that the expansion of paramedical services at the village level would make health services and information more rapidly available to the rural people. However, the VHVs and VHCs are not government officials, but villagers, who voluntarily assume the role of a linkage between the government health centre and the rural households. They receive no salary from the government. The only economic benefit they officially obtain is free medical care from the MOPH. Thus the success of the PHC program in Thailand is dependent upon active community participation.

Figure 4.2 : Primary health care structure in Thailand



Source: Modified from Sermsri (1989, Figure 7.2, p. 172).

The government PHC program concentrates on ten aspects of PHC including nutrition, sanitation and water supply, maternal and child health, immunisation, disease control, and essential drugs. The selective approach of the PHC program may only have a short-term impact upon health problems because it ignores the underlying causes. An appropriate PHC approach as suggested by NGOs, calls for social and structural changes through centralisation of decision-making and services (Wiwat et al., 1986: 36).

The government-sponsored primary health care has so far encountered many problems including the brief duration of the training of the local health volunteers; inadequate follow-up work by district and provincial health officials; weak co-ordination between various divisions within MOPH which often results in excessive and conflicting demands on officials (Bowornwathana, 1984: 183); lack of co-ordination from physicians in district hospitals; and a low level of community

participation in decision-making, due in part to persisting preoccupation of government with centralisation (Cohen, 1988: 166; Gohlert, 1991: 112).

Although the PHC program has been implemented widely in Thailand, the current form of popular participation may not be sustained in the long term and more importantly it may not meet the health needs of the population. Several experts have argued that the expansion of the paramedicals in rural villages is the establishment of the local bureaucracy of the MOPH and that extends the government control over the PHC (Bowornwathana, 1984: 183; Wiwat et al., 1986: 36). Cohen (1988: 174) maintains that 'the prospect of health care for Thailand in the short-term is a dual system of health care with entrepreneurial medicine flourishing in the large cities and a system of PHC in rural areas starved of funds unsupported by structural reform'. Non-government organisations in Thailand have called for more comprehensive approaches and social justice through decentralisation of decision-making:

> Undoubtedly in the future, a major restructuring will have to take place, with more networking, less bureaucracy; more initiative from the people, less control by the government; with a reallocation of resources and power. Only by supporting the people's efforts towards self-reliance and community participation, can we hope to strive towards 'Health for All by the Year 2000' (TDN, 1986: 4)

4.4.2 Private health sector

The private sector has become involved in providing western medical care alongside the public sector since a mushrooming of private hospitals and specialist clinics in the 1980s. Although the public and private health sectors are theoretically separate, most health practitioners (physicians, dentists, pharmacists, nurses, and technicians) who are employed in the public service have private 'after hours' practices (Riley and Sermsri, 1974; Krongkaew, 1979: 38; Smith, 1982: 515). The private sector emphasises curative care with advanced technology and specialised care, which is generally high cost, and fees charged are also high. The coverage of private practitioners is limited to the relatively small urban middle and upper income groups who are willing and able to pay these high fees.

Drugstores are the main suppliers of the medicines used in self-medication among the Thais. Self-medication is widely practiced, and both western and traditional drugs are available in drugstores, groceries, and through drug vendors. The owners of drugstores are often not formally trained in pharmacy, but give advice and select medicine for their customers (Sermsri, 1989: 169). The dispensing of drugs is neither highly institutionalised nor easily controlled by the government. Prescriptions are not required to buy drugs from private drugstores where a wide ranges of drugs including antibiotics and dangerous drugs are available (Grand and Sri-Ngernyuang, 1989: 12; Sermsri, 1989: 169). According to recent studies, Thailand now has the highest per capita drug consumption in the ASEAN countries and drug over-consumption has become a serious health problem (Cohen, 1988: 164; Grand and Sri-Ngernyuang, 1989: 12). In 1988, approximately 30,000 brand names of drugs were available, but only 402 items were listed as essential drugs (Gosling, 1988 cited in Grand and Sri-ngernyuang, 1989: 12). Eighty per cent of drugs were distributed through the private sector in 1982 (Cohen, 1988: 164). The easy availability and high consumption of drugs have created serious health problems for individuals and communities, as well as the nation as a whole.

4.4.3 Traditional practitioners

Traditional medicine played an important role in providing health care in Thailand long before the arrival of western medicine. The Thai traditional medical system is influenced mainly by the Chinese and Indian traditional medical systems, and by Buddhism. It is closely linked to religion and superstition and is considered by many to be unscientific and ineffective (Ketusingha, 1978: 12; Keranpong, 1982: 18; Sermsri, 1989: 163; Grand and Sri-Nguernyuang, 1989: 13). Traditional methods of healing have blended into Thai culture and become part of the Thai way of life.

Practitioners of traditional medicine may be considered a part of the private sector as almost all traditional healers operate in an informal context. Various types of healers practice, but three, namely, *maw paen boran* (traditional healers), *maw*

yaa (traditional pharmacists), and *maw tam yae* (traditional birth attendants) are recognised by the government through registration. In 1932, the government passed the Medical Practices Control Act which made it compulsory for traditional practitioners to register, but they also had to pass an examination. In 1986, 13,086 traditional medical doctors, 13,691 pharmacists, and 2,041 traditional midwives were registered (Archananupab, 1987: 31). However, the actual number of traditional practitioners has been estimated by Archananupab (1987: 31) as between 60,000 and 120,000 for the whole nation.

Traditional healers and use of herbal medicine remain important health care alternatives in Thailand, particularly for the rural people (Rauyajin and Keowthep, 1980: 77 cited in Archananupab, 1987: 13; Sermsri, 1989: 162). Sermsri (1989: 165) suggested that the persistence of traditional medicine was due largely to the social and cultural similarity between practitioners and patients, and the relatively low cost of treatment. A herbal medicine program was officially introduced into the PHC in 1985. The use of herbal medicines increased from 17 per cent in 1979 (Sepulveda and Menesis, 1980) to 30 per cent in 1988 (Drug Studies Group, 1989). Some medicinal plants have been studied by the Division of Medical Research, but traditional medical care has not been offered in government hospitals (WHO/ROSEA, 1985: 197).

Buddhist monks play an important role in the community life in Thailand. The *wat* (temple) is often the centre of community activities, and monks are considered to be knowledgeable people who command respect. In the past, monks contributed a great deal to community life by teaching and providing health care in villages throughout Thailand. Once the public schools were established, the educational role of the monks declined, although they continued to teach young men about Buddhism. However, monks still play an important role as healers using herbal medicine and religious and spiritual rituals in treating the sick (Archananupab, 1987: 33; Sermsri, 1989: 162). Although the Medical Practices Control Act 1932 has prohibited such practices and many monks have stopped practicing, the rural

people in particular still consult monks when they get sick and many monks have committed themselves to providing help to the community. Some have gained a reputation for this work, such as Pra Jamroon Banjan at *wat* Tum Kra Borg in Saraburi province who treats drug addiction, Prakru Voravetvisarn in Chonburi province who is an expert in treating bone fractures, and Prakru Vichitra Tunyakul in Pathomthani province who treats paralysed patients (Archananupab, 1987: 33).

Traditional birth attendants (TBA) or *maw tam yae* are another type of traditional practitioner who are highly regarded and still actively involved in rural villages. TBAs are usually elderly women who have already experienced childbirth. According to the official registration, approximately 2,041 TBAs were registered in 1986. However, these figures are believed to be an underestimate. It has been estimated that there are at least two TBAs in each village. The national survey of traditional practitioners conducted by the Division of Family Health in 1986 recorded 21,793 TBAs (Sujpluem, 1986: 10). Births in rural villages are still attended by TBAs. For example, the births of 31 per cent of rural children born between 1982 and 1987 were attended by TBAs, while the comparable figure for urban children was only two per cent (Pitaktepsombati and Wongboonsin, 1989: 111). In recognition of the important role of TBAs in providing maternal and child care, together with the shortage of health personnel and a high infant mortality rate due to tetanus neonatorum, the MOPH launched a training program for TBAs to improve their hygiene practices. Up until 1986, 12,864 TBAs had been trained including all registered TBAs in the four southernmost provinces.

4.5 Utilisation of maternal and child health services

This section describes the pattern of preventive health services utilisation using the data from TDHS. In this study analyses of utilisation of health services were confined to the sub-sample of ever-married mothers of children under five years of age (who were born between January 1982 and January 1987) in the Northeast region. However, for the descriptive analysis, both national and regional differences

were examined. There were 3,626 (weighted) children who met the criteria for the country as a whole, and 735 (unweighted) children representing the Northeast. The variables of interest to this study were those related to preventive maternal and child health services rather than curative medical services. Five utilisation measures were investigated. These were whether women had received a tetanus toxoid injection during the pregnancy leading to the birth of those children, the type of prenatal care received, the type of attendant at delivery of children, ownership of child immunisation or health card, and child immunisation.

Table 4.9 presents the percentage distribution of children (weighted numbers) under five years of age by type of preventive health services utilisation across the regions. At the national level, for births between 1982 and the survey date, 46 per cent of mothers received prenatal care from doctors, 31 per cent from a nurse or midwife, and another 22 per cent did not receive prenatal care at all. The proportion of mothers receiving prenatal care by trained health professionals was very high in Bangkok (87 and 9 per cent seen by doctor and nurse or midwife respectively). In the Northeast and the South, the majority of mothers relied on care by a nurse or midwife (42 and 40 per cent of mothers in the Northeast and South region respectively). In addition, relatively high proportions of mothers in those regions did not receive prenatal care from health professionals (24 per cent in the Northeast and 28 per cent in the Southern region).

For one-third of births between 1982 and 1987 the survey date for the country as a whole, mothers reported having been given tetanus toxoid injections. In all regions, excluding Bangkok and the Southern region, more than one-third of mothers had been given tetanus toxoid. As many as 72 per cent of mothers in both the Northeast and Northern region received the injection. Possible explanations for the proportion of mothers receiving tetanus toxoid injections being lower in Bangkok are that both health personnel and medical equipment are better in Bangkok and also hygienic conditions are much better than in other regions. Therefore, the need for vaccination for pregnant women who were most likely to

deliver in institutions is less, compared to those outside Bangkok where there are still few such facilities. To be fully protected, a pregnant woman requires two injections during the course of pregnancy, at six and eight months' gestation. However, the protection could last for another three years and if a subsequent pregnancy occurs within this period, the mother is not required to have another injection. This may be the case for women in urban areas such as Bangkok. Other potential data quality issues arise in relation to this variable. Women might be confused about other injections received during their pregnancy. For example, some women might receive vitamin injections which are commonly given in rural areas. (Even though oral vitamins are available, most women prefer to have an injection as they believe that it is highly effective).

Deliveries of two-thirds of the births in Thailand between 1982 and the survey date were assisted by trained modern health personnel. The remainder of deliveries took place in the hands of traditional trained birth attendants or relatives. As might be expected, almost all women in Bangkok delivered their babies under the care of health personnel and only three per cent were assisted by others. In the Northeast, the largest proportion of deliveries (39 per cent) took place outside institutions and were attended by traditional birth attendants. Only half the women (51 per cent) delivered their babies under the care of trained health personnel. Nearly 10 per cent of births were assisted by others such as relatives or even no one.

Data on the ownership of an immunisation or health record card indicates that less than half (44 per cent) of children under five years of age were reported as having health record cards. In the Northeast, more than two-thirds of children (71 per cent) had no card at all and only 21 per cent of mothers were able to present health record cards at the time of interview. The use of ownership of a health record card as a measure of health service utilisation in this case may lead to an underestimate, since only health cards which included an immunisation record were requested in the TDHS survey. Other cards or booklets which do not contain immunisation information are in use for different purposes, such as health cards

issued by the Nutrition and Family Health Division, the Communicable Disease Control Division, or other health institutions. They should be considered, but information on other health cards is not available. Therefore, care should be taken in interpreting the results.

Table 4.9 : Ever-married women with children under five by utilisation of preventive health care and region, Thailand, 1987 (Percentage)

Health services	Northeast	North	Central	South	Bangkok	Overall
Type of prenatal care						
Physician	34	55	69	31	87	47
Nurse/midwife	42	28	17	40	9	31
Other	24	17	13	28	4	22
Given tetanus toxoid vaccine						
Not given	28	28	31	35	40	33
Given	72	72	69	65	60	67
Type of attendant at childbirth						
Physician	27	60	69	24	89	44
Nurse/midwife	23	16	18	43	9	22
Traditional	39	15	7	32	2	26
Other	10	9	5	1	1	8
Ownership of health record card						
No card	71	39	48	52	26	56
Yes, seen	21	46	31	28	49	29
Yes, not seen	8	16	21	19	25	15
Child immunisation (at least one)						
Never immunised	14	11	14	25	3	16
Yes (mother reported)	62	42	53	46	47	52
Yes (health card)	24	47	33	30	50	32
Total	35	19	19	16	10	100
	(1281)	(698)	(683)	(586)	(378)	(3626)

Notes: 1. Figures in parentheses are numbers of children, excluding missing values.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape (utilise.sps).

The data on child immunisation in Table 4.9 covers all children under five who were immunised at least once according to the mother or the health record card. Slightly more than half of all children were reported immunised and nearly one-third who had a health card were immunised. Less than fifteen per cent of children in most regions were classified as never having been immunised, except in the South, where 25 per cent of children were not immunised.

In the Northeast, the data in Table 4.10 show that the place of residence was associated with different patterns of utilisation of health services. The urban respondents revealed a more desirable pattern of use of health services than rural respondents. For example, 73 per cent of pregnant women in urban areas visited qualified health personnel while the corresponding figure for rural women was only 30 per cent. Twelve per cent of urban women were not receiving prenatal care, despite the ready availability of a variety of health services in urban areas. However, the figure for rural respondents was twice as high.

Table 4.10: Ever-married women with children under five by utilisation of preventive health care and place of residence, Northeast Thailand, 1987 (Percentage)

Health service	Urban area	Rural area	Overall
Type of prenatal care			
Physician	73	31	39
Nurse/midwife	15	45	39
Other	12	24	22
Given tetanus toxoid injection			
Not given	22	27	26
Given	78	73	74
Type of attendant of delivery of children			
Physician	71	24	34
Nurse/midwife	21	25	24
Traditional birth attendant	3	39	32
Other	5	11	11
Ownership of child immunisation or health card			
No card	45	73	67
Yes, seen	41	20	24
Yes, not seen	14	8	9
Child immunisation (received at least one)			
Never immunised	6	14	12
Yes (mother reported)	51	63	60
Yes (health card)	43	23	28
Total	20	80	100
	(150)	(585)	(735)

Notes: 1. Figures in parentheses are unweighted numbers of children born to women after January 1982.
2. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape (utilise.sps).

The data show no substantial difference between rural and urban women in receiving tetanus toxoid injections during pregnancy. As expected, type of

assistance at the delivery of the children contrasted widely according to place of residence. The majority of urban women were assisted by western trained health personnel (92 per cent), compared with less than half of rural women (49 per cent). By contrast, the majority of rural women relied on traditional trained birth attendants or were assisted by relatives (39 and 11 per cent respectively). Ownership of a health record card was another health measure of interest, and again the data showed a marked contrast between urban and rural children. More than half (55 per cent) of urban children had health cards while only 27 per cent were found among rural children. Reported levels of child immunisation were quite high in both place of residence: only six and 14 per cent of urban and rural children respectively were never immunised.

Relatively high proportions of women received medical attention of some kind for prenatal care and tetanus toxoid injection. However, the majority of deliveries (43 per cent) were subsequently handled by traditional practitioners, especially among rural women (51 per cent) (Table 4.10). This seems to contradict the hypothesis that past health care experiences affect the use of subsequent health care services by women. There is a substantial literature on consumer satisfaction with health care in the context of the European and North American countries. Issues concerning the extent to which a previous adverse outcome affects subsequent pregnancy needs and satisfaction with health care has become the main focus of most studies. Oakley (1991: 652), reviewing the literature, concludes that satisfaction with past medical care is an important determinant of subsequent medical care experiences. Factors found to be associated with the use of subsequent health services include age of patient, household composition, transport cost, travel time, severity of illness, beliefs, and quality of health care (Garcia, 1982; Cosminsky, 1987: 1169; Rothman, 1987; Oakley et al., 1990). Another important factor determining the use of subsequent medical care is consumer satisfaction with the previous medical care and this is also true for maternity patients (Oakley, 1991: 652).

Table 4.11 presents data on the percentage distribution of children under five years of age according to type of immunisation and full immunisation coverage. Only children who owned health cards or booklets recording immunisation information were analysed by taking into account the age of the child and the specific type of vaccine based on the Ministry of Public Health. For instance, the coverage of the tuberculosis vaccine or BCG was only examined for children aged one month or older, while the analyses for the first, second, and third doses of DPT and OPV were based on the children aged three months or older, five months or older, and seven months or older respectively. The overall coverage for BCG vaccine was remarkably high, 91 per cent of children with health cards. Although the data show a slight variation in the BCG coverage across the country, only two regions (Northeast and Central) had less than 90 per cent of children immunised. The highest coverage of BCG was found in Bangkok where at least 96 per cent of children were immunised.

The coverage of measles vaccine was low among Thai children aged 10 months or older. Only 39 per cent of them were immunised. The lowest proportion of children who had been immunised with measles vaccine was found in the Northeast (30 per cent). The very low coverage of measles vaccine reflects the fact that this type of immunisation was only recently introduced into the National Expanded Program on Immunisation (EPI) during the Fourth National Economic and Social Development Plan (1977-1981). At the early stage, measles vaccine was not made available nationwide and only parents who could afford to pay for the vaccine (100-150 *baht* or equivalent to A$ 5-8) had their children vaccinated. Not until the Fifth National Economic and Social Development Plan (1982-1986) was the vaccine made available nationally and provided free of charge.

Table 4.11: Children under five according to type of immunisation and region (only children who had immunisation or health card), Thailand, 1987 (Percentage)

Immunisation	Northeast	North	Central	South	Bangkok	Overall
BCG (Tuberculosis vaccine)						
Not given	11	7	13	10	4	9
Given	89	93	87	90	96	91
DPT dose 1						
Not given	3	6	8	4	6	5
Given	97	94	92	96	94	95
DPT dose 2						
Not given	19	14	16	14	12	16
Given	81	86	84	86	88	84
DPT dose 3						
Not given	34	23	28	31	21	27
Given	66	77	72	69	79	73
OPV dose 1						
Not given	4	6	9	4	7	6
Given	96	94	91	96	93	94
OPV dose 2						
Not given	19	15	17	16	14	16
Given	81	85	83	84	86	84
OPV dose 3						
Not given	35	23	29	32	22	28
Given	65	77	71	68	78	72
Measles vaccine						
Not given	70	54	65	61	54	61
Given	30	46	35	39	46	39
Completeness of immunisation (combined BCG, DPT, OPV, and measles vaccine)						
Never immunised	0	2	4	1	1	1
Incomplete	35	21	26	30	19	26
Complete	65	77	70	69	80	72
Total	25	25	19	14	17	100
	(255)	(258)	(192)	(143)	(178)	(1026)

Notes:
1. Figures in parentheses are weighted number of children.
2. DPT, Diphtheria, Pertussis, and Tetanus vaccine.
3. OPV, Oral Polio vaccine.
4. Estimates of completeness of immunisation were obtained by taking into account both type of immunisation and age of child according to the Ministry of Public Health schedule of immunisation.
5. Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape (immune.sps).

There were marked dropout rates for those types of vaccination that required more than one dose to have full protection, such as DPT and OPV vaccines. The proportion of children who had been vaccinated with the first dose of DPT and OPV were as high as 95 and 94 per cent respectively; the coverage rate dropped to 85 and 73 for DPT and 84 and 72 per cent for OPV for doses two and three respectively.

However, 72 per cent of children were fully immunised and less than two per cent of children who had health cards were never vaccinated. Again, there was slight variation across regions in the completeness of immunisation and the children in the Northeast had the lowest rate of full immunisation.

4.6 Health services in the case study village

Various kinds of modern and traditional health care services were available in the case study village and neighbouring towns in 1992. Although traditional medicine has long been accepted and is part of the village way of life, it was becoming less popular and many former traditional practitioners no longer practised traditional medicine. In contrast, modern medicine had become more acceptable and was widely used partly because of the effectiveness of modern drugs and the availability of modern health facilities. Self-medication was still widely practised in the village where various kinds of drugs, particularly modern pharmaceuticals, could be purchased from groceries in the village, drugstores in towns, and drug vendors. The health centre, the only public health institution located in the village, provided integrated health care services to the villagers and those in neighbouring villages. Community-based health activities included popular participation, a sanitary revolving fund, welfare card, health card, and nutrition program. The health card entitled the villagers to have health services at the hospitals free of charge. Nevertheless, only poor families made use of such services. Those who were better off still preferred private medical facilities, where service was faster and considered to be more effective. The pluralism of health care services in the case study village is discussed in this section.

4.6.1 Public health care facilities

Ban Tha was the sub-district administrative headquarters where local government organisations and institutions, including the health centre, were located. Road communications were well established; so villagers also had access

to nearby towns where other kinds of health facilities were available. These are discussed in the following sub-sections.

The sub-district health centre. The health centre was the only public health institution located in the village to render integrated health care services. It served not only the villagers, but also those who lived in the 10 villages under the jurisdiction of this sub-district, which had a population of 6,197 persons in 1991. When the health centre was first established in 1972, it was staffed by a newly graduated midwife who had received one-and-a-half years formal training from the midwifery school in the provincial town. At the time of field work, she had been working and living in the health centre continuously since graduation. In 1992, a total of three health personnel were employed, including the midwife as the health centre chief, one male junior sanitarian (the midwife's husband), and one female junior health worker. The junior health worker had recently transferred from another health centre in this district. She lived in the provincial town, 32 kilometres away, and commuted to the village daily. According to the health centre chief, in the seventh health plan (1992-1996), two additional health personnel (one technical nurse and another junior health worker) would be allocated, and more medical equipment and supplies installed.

The health centre, located in the middle of the village (see Chapter Three, Map 3.2) consisted of a one-storey building, two staff houses with two large water containers each, two tube-wells, and electricity. The health centre building was divided into five sections: administration, an emergency room, a storage room, a one-bed patient room, and a room for the well-baby clinic and antenatal care. Two toilets, one for the health personnel and the other for patients, were also provided. Piped water was not available in the village or the health centre, so rain water was used during the rainy season, and water from the tube-wells at other times.

The administration room in the middle of the building occupied nearly one-fourth of the building. All documents and official records were kept on shelves behind two tables in the middle of the room, where patients were registered. The

emergency room was an area of about six square metres to the front right of the building. It was crowded with one examination bed, two small tables with many trays each containing a few medical instruments, one cupboard storing a few supplies such as gauze, cottonwool, bandages, syringes and needles, one basin, one garbage can, one refrigerator, and one gas stove with a boiling pot for sterilising medical instruments.

The Well-baby Clinic and Antenatal Clinic were supposed to be held in the west end room of this building, but the room had not been used for almost a year, mainly due to inconvenience and a lack of equipment. Often a staff member was assigned to do other tasks such as meetings, assisting in the district health office and training outside the village, resulting in one or two staff being left to provide health services at the health centre. Thus, all health care activities, whether preventive or curative, were performed in the emergency room and used the same set of equipment.

The one-bed patient room at the rear of the building consisted of one bed with a mattress, one chair, and one stand for intravenous infusion. It was used for all purposes including childbirth, treating patients with acute diarrhoea or other diseases that required observation, and for those who required intravenous infusion. Neither a mosquito net nor blanket was provided.

The health centre was open from 8.00 am to 4.00 pm, from Monday to Friday. One staff member was assigned to refill the water in the toilets and to sweep the floor early in the morning. After working hours and during weekends, health care services were provided at the midwife's home just a few metres from the health centre. Patients who visited the health centre at night were almost all emergency cases, such as accidents, severe diarrhoea, high fever, and labour pains. The health personnel stored common drugs at home for such patients, but if patients needed observation they could stay in bed in the health centre until their condition was stable or until they were picked up by relatives.

A daily work schedule was prepared for all routine work (see Table 4.12), while a more flexible monthly work plan was set up at least one month ahead. The daily work schedule, particularly for preventive health care services (well-baby clinic, family planning, immunisation, and antenatal care) corresponded to the working schedules in other public hospitals. This fixed schedule of preventive health services was introduced throughout the provinces to accommodate and ease the referral system between the higher-level facilities and the health centres. After discharge from hospital, postpartum women and new-born babies were to be referred to receive postnatal care, immunisation, family planning, and nutritional surveillance from the nearest health centre. Health personnel were expected to visit the referred cases at home. However, many problems arose from the referral system. For instance, according to the health personnel's point of view, many patients did not inform them after returning home. The villagers also complained that the health personnel paid no attention to poor villagers who could not afford to pay for services.

Table 4.12 : Daily work schedule for the health centre in Ban Tha, 1992

Day	Morning (8.00-12.00 am)	Noon (1.00-4.00 pm)
Monday	Medical care	Home visit
Tuesday	Well-baby clinic	Home visit
Wednesday	Family planning	Home visit
Thursday	Antenatal care	Antenatal care
Friday	School health program	Reporting & filing

Health care services and programs offered in the health centre. In 1992, the health centre provided a wide range of health care services, including medical care of common diseases, minor surgery for emergency cases such as wound dressing, stitching and stitch removal, and drainage of abscesses, ante-natal care and pregnancy tests, delivery and post-natal services, well-baby clinic, immunisation, growth monitoring and nutrition program, family planning program, school health program, health education program, clean water and sanitation program, health

worker training program, and home visits. However, health personnel considered medical care services to be the most important and these consumed much of their working time. Although the daily activity schedule (Table 3-12) showed that medical care was only offered every Monday morning, in reality, it was difficult to restrict medical care to a fixed date. In rural areas where most villagers were engaged in agricultural and labour work, timetables largely depended upon the season and demand for labour. As a result, villagers visited the health centre whenever they were free from work - either early in the morning or late in the evening. In some cases, they did not visit the health centre or hospitals at all, but sought self-medication as this was less time consuming. Therefore, medical care services were actually performed every day and consumed most of the health personnel's working time, even after working hours. As a result, activities such as home visits and the school health program were not frequently performed. For example, the school health program was scheduled every Friday morning, but, in practice, the health personnel visited only one primary school during the period May to July 1992.

Although the health centre was built in 1973, the public health project was not initiated simultaneously. Until 1977, when an additional staff member, a sanitarian, was assigned, the public health project supported the government public health program which emphasised personal and household hygiene, a clean water supply and proper disposal of human waste, and a food supplement project. The first two tube-wells were built in the village, but the water from these tube-wells was not used for drinking because it was hard. In 1984, the sanitation and large water jar revolving funds were initiated. In 1992, about 80 per cent of the households had toilets and 90 per cent had large water jars or containers to store rain water for household use.

The primary health care program. The PHC program was introduced into the village health system in late 1982. Health personnel were involved in the selection and training of a VHV and VHC. No village drug co-operative was

established, but other funds such as the sanitary and large water jar revolving fund were set up. In 1992, three VHV and thirteen VHCs were in service. According to health personnel, these village health workers had been actively involved in health activities at the beginning of the PHC program. However, they no longer functioned well.

While I was staying in the village, the health personnel had assigned the VHVs and VHCs to hold the growth monitoring activities to weigh all children under five in their clusters. Only three VHCs complied with the assignment and submitted their records. One female VHV was selected to replace the previous one who had resigned for personal reasons. According to the midwife, she was a respectable, influential, and rich person who was very active, but did not have time to participate in the community activities. The selection of the VHV and VHCs was supposed to be carried out using a sociogram, but, in practice, the selection was made entirely by the health personnel and village headman without consultation with the villagers.

The nutrition program. The nutrition program was first introduced in 1985 as one of the primary health care elements. The activities mainly concentrated on nutrition education, demonstration of supplementary foods, promotion of breastfeeding, and growth monitoring. In 1992, the food supplement project was the first project initiated and organised by the health personnel. It was proposed to the district health office in October 1991, and was approved and allotted 3,000 *baht* (A$ 160). It aimed to alleviate second and third degree childhood malnutrition by distributing fresh milk to the children daily. However, only two children had been classified by the health workers as having second degree malnutrition and none as having third degree malnutrition. A similar project being implemented in 1991 as part of the district nutrition project, applied a different approach. In the second project, the identified children received a daily coupon worth three *baht* which could be exchanged for high-protein foods such as eggs from the groceries in the village. The major difficulty was that the foods were not always given to the underweight

children, but shared among the family members. To overcome this problem, the health personnel replaced the coupons with a pack of fresh milk (250 millilitres) supplied by the agricultural college in the district twice a week. The children had to drink the milk daily in front of the health personnel. The project lasted for three months, and the children's weights were recorded monthly. According to the health personnel the project was successful and the nutritional status of the two children gradually improved. Their weight-for-age based on the Thai standard increased to the stage where they had only first degree malnutrition.

This example shows that the health personnel were able to initiate projects adapted to local problems and were free to manage the project by themselves. However, I observed several problems. First, the health personnel admitted that they lacked experience in formulating and evaluating the project, and they expected too much from their superiors as well as from the villagers. In-service training on project management was needed. Second, due to improper management and lack of communication between the health personnel and the villagers there was often no milk left for the two children with second degree malnutrition. Even though the milk was kept separately in the health centre, I noticed that often the health personnel gave it to their own children. This created a negative impression of the project as well as of the health personnel. Third, the community did not participate actively in the project, which was organised entirely by the health personnel without consulting the villagers or even the VHVs and VHCs. The health personnel viewed the villagers as passive 'recipients'. Furthermore, the project used a curative approach to treat second and third degree malnourished children. Ideally, it should have covered a wider population and focused on the prevention of malnutrition, particularly among the 20 per cent of children suffering from first degree malnutrition. Integrated activities and intervention should have linked malnutrition to its social, economic and other health context.

Although a health centre was located in the village, the villagers visited it infrequently. They would rather buy drugs for self-treatment or by-pass it to visit

private clinics and hospitals in towns. I conducted focus group discussions and made regular visits and interviewed eight families regarding the health seeking behaviour of family members. The following examples demonstrate that there were various factors affecting the lower popularity of the health centre including ineffective drugs, expense, long waiting time for services, inefficiency, and social distance.

The problem of ineffective drugs was due largely to the very small budget allocated to the health centre. Only about A$ 500 per year was allotted for medicine and medical supplies. Although these could be purchased at low prices at the district hospitals, like the bureaucratic processes elsewhere in Thailand, this took a long time. As a consequence, the health personnel preferred to purchase both brand name and generic drugs from drugstores or pharmacies in towns. In addition, as the health personnel also operated their own clinics, they received a commission and could buy brand name drugs for themselves at a lower price as well. However, the budget did not enable them to supply sufficient drugs to be prescribed throughout the year. Such problems had led to negative attitudes toward the health centre and local health personnel and the villagers' seeking health services from other sources, such as groceries or drug stores, private clinics, and hospitals in towns.

Three case studies conducted during field work reveal many of these problems.

Bang's family was an extended family consisting of a father, 72 years old, a mother aged 70, a 40 year-old daughter, two sons, one daughter in-law, and three grand daughters. This family was selected to participate in the nutrition program because the youngest girl, aged four years, was malnourished. She had contracted pneumonia when she was eight months old. Her parents took her to the health centre at night immediately after she showed symptoms of a high fever. The health worker examined her and prescribed two bottles of syrup. Even though she took the medicine, she was restless and the high fever persisted the whole night. She was taken back to the health centre the following morning, but the health personnel

insisted that her illness, would take some time to be cured and prescribed one more bottle of syrup. On the same day, many neighbours visited and suggested that she should be taken to the private clinic in the provincial town. This clinic was operated by a medical doctor who specialised in childhood diseases and had a good reputation. The parents, therefore, took the girl to the private clinic in the afternoon. The doctor said that she had severe pneumonia and required hospitalisation. He referred her to the general hospital, where she and her mother stayed for one week until she was discharged. She had then contracted pneumonia twice since the first sickness, and her parents took her directly to the same clinic without visiting the health centre again. They blamed the health worker for not immediately referring her to have proper treatment, and lost confidence in the health personnel as well as in drugs obtained from the health centre.

Noi's family. Noi was a married woman aged 43 who contracted diarrhoea accompanied by vomiting. She was sick during the cassava planting season, when all the family members were busy working in the field. Her husband suggested that she should take a rest at home and just wait and see. Meanwhile she did not take food (the family normally ate steamed glutinous rice with traditional *Isan* food), except for soft rice porridge with salt. The diarrhoea persisted for three days after the onset. Then, her husband took her directly to the district hospital instead of the health centre in the village. He said this was because he thought the health centre medicines were not effective. Although this family was very poor by village standards, they preferred to use high-level health care facilities outside the village rather than the local health care facilities.

This seems to contradict the standard argument about effect of economic circumstance on health seeking behaviour. The economic factor is not the only factor influencing utilisation of available health services; villagers' 'wait and see' behaviour, attitudes towards the health centre, and past experiences have contributed a great deal to whether or not to utilise the existing health care facilities.

Tim's family. Two brothers aged 11 months and 28 months old had contracted diarrhoea and fever respectively. The family was relatively poor; the parents were farmers and casual labourers. The mother, 24 years of age, bought drugs from the former *phaed tambon* (sub-district doctor) to treat the two boys just a few hours after the onset. She chose to buy drugs from the grocery because they were cheaper than those from the health centre. She also thought that they were more effective, and she did not have to wait such a long time as at the health centre. In 1991 when her youngest son had had high fever, she had taken him to see the health personnel at the health centre early in the morning. The health worker had asked her to wait until late. Eventually they were attended to by the midwife and she prescribed the child two bottles of syrup costing 25 *baht*. Her son took the medicine for two days, but high fever persisted. She then took him to the former *phaed tambon*, who gave her a bottle of syrup costing ten *baht*. Her son recovered from the fever only a few days after taking the new drug. Since then she had always bought drugs from the *phaed tambon* for every family member. She only bought the contraceptive pill from the health centre because it was not available elsewhere.

The effectiveness of medicine was always a major concern among the villagers. In Thailand, a wide range of medicine can be obtained from various sources including drugstores or groceries. Commercial drugs are widely advertised on television, radio, and other kinds of media. These advertisements have influenced drug consumption.

Over-consumption of drugs has been a serious concern in the village, even among young children. There was evidence that the 28-month-old boy was given two packs of two different brand names of anti-pyrexia at once to treat the high fever. The two brand name drugs both contained aspirin and one of them also contained caffeine. The problems of drug consumption and distribution in the village have apparently had a very great effect on the villagers' way of life.

Other public health care facilities and services were available in nearby towns. For example, two district hospitals, (one with 30 beds and one with 10 beds)

were located 20 and eight kilometres respectively from the village. One teaching (university) hospital and one general (former provincial) hospital in the provincial town about 32 kilometres away were fully equipped with all types of facilities and personnel and provided both curative and preventive medicine. A psychiatric hospital and one Health Promotion Centre Region 6 (former a maternity hospital, where most villagers preferred to deliver their babies) were also located in the provincial town. Many other special health institutions such as the centre for malaria control, venereal diseases centre, centre for nutrition, and centre for sanitary services were also located in the provincial town.

4.6.2 Private health care services

Village stores and injection doctors were important private health services in the case study village. Village stores were an important source of drugs. Modern drugs had become available in the village stores since private pharmacies gained access to the villages. In 1992, there were 11 stores in the village. I surveyed types of drugs selling in the village stores as shown in Table 4.13.

Eleven village stores were all selling drugs, both brand name and common drugs. Drugs available in the village stores were obtained either from drug-stores in town or drug vendors. The drug vendors visited the village occasionally and illegally supplied drugs such as amphetamines and *yaa chud* (combinations of four or five kinds of drugs, mostly pain-killers, vitamins and steroids, in one packet). Many brand names were available at the stores. *Yaa song* (a combination of aspirin and caffeine packed in the form of powder), was very popular among villagers and low income workers elsewhere in Thailand. Visisthanonda (1991: 96) in working in one district hospital in Khonkaen province, found that about 90 per cent of working adults aged 15 years and older were addicted to *yaa song*, which can create many health problems including peptic ulcers and addiction. Both *yaa chud* and *yaa song* were widely used among farmers and low-income workers in my study village. They believed that the drugs were effective in pain relief and gave them energy to continue work. I saw that many villagers purchased *yaa chud* from the village stores on the

way to their fields in the morning, so that they could take it in the fields, and some also bought *yaa chud* in the evening. Although most people knew of the dangers of *yaa song* and *yaa chud*, they claimed work these drugs were essential to enable them to bear the hard work they had to do.

Table 4.13: Types of medicines available at the village stores, Ban Tha, 1992

Types of medicines	Village store number										
	1	2	3	4	5	6	7	8	9	10	11
Antibiotics											
penicillin	y	y	y	y	y	y	y	y	y	y	y
heromycin	y	y	y	y	y	y	y	y	y	y	y
neomycin	y	y	y	y	y	y	y	y	y	y	y
vikul	y	y	y	y	y	y	y	y	y	y	y
sul-bco	y	n	n	y	y	y	n	n	n	y	y
Analgesics (*yaa song*)											
hua singha	y	y	y	y	y	y	y	y	y	y	y
buad hai	y	y	y	y	y	y	y	y	y	y	y
pra sat noo raed	y	n	n	n	n	y	y	y	y	y	y
paracetamol	y	y	n	n	n	n	n	n	n	y	y
bura	y	n	n	n	n	n	n	n	n	n	n
Cough syrup	y	y	y	y	n	n	n	n	y	y	n
*Yaa chud**	y	y	y	y	y	n	n	y	y	y	y
Injections	y	n	n	n	n	n	n	n	n	n	n

Notes: 1. * Combination of various tablets including steroids, vitamins, and analgesics.
2. y denotes available, and n refers to not available.

In Thailand injection doctors are illegal practitioners who have received no formal training but give injections to the sick. In the case study village, there were two injection doctors, the former *phaed tambon* (sub-district doctor) and his wife. The *phaed tambon* was formerly appointed by the Ministry of Interior to provide health care using standard medicine purchased from the government hospitals. However, after the public health services provided by the Ministry of Public Health were expanded and extended throughout rural areas, this Ministry of Interior scheme for health care services was dropped. The *phaed tambon* ceased his formal health duties in the early 1980s. However, he continued to give injections, although he was

not supposed to practice while he was *phaed tambon*. Many villagers from both the village and neighbouring villages used his services. He not only gave injections, but also administered intravenous fluid. Common illnesses among those visiting the injection doctors were pains in the body, leg pain, and fatigue. Fatigue was always treated by administering intravenous fluid. Both medicine and intravenous fluid were purchased from drug stores in the towns. The *phaed tambon*'s wife learned from him, and was able to provide services to their clients. This family also sold many brand names of drugs as well as *yaa chud* and *yaa song*. The midwife and her husband also operated a private clinic after hours at home. Many brand name medicines which were not available at the health centre were prescribed in the private clinic. A wide range of medical care, including injections and intravenous transfusion, was also offered. Apart from these private health services in the village, similar services were also available in nearby towns. These included injection doctors, drug stores, village stores, clinics, and polyclinics as well as private hospitals, all offering modern health care.

4.6.3 Profiles of traditional practitioners

Despite the rapid increase in the popularity of modern medicine, traditional practitioners were still used in the village, although their importance was declining. These local practitioners found in the village and neighbouring villages included *maw tam yae* (traditional birth attendants), *maw pao* (blowers), *maw yaa* or *phaed paen boran* (herbalists), *maw nuead* (masseuses), and *maw lam phi faa* (mediums). These traditional practitioners, except for the *maw tam yae* and *maw lam phi faa*, frequently knew and used both herbal medicine and magical treatment.

The *maw tam yae* (traditional birth attendant) remained an important source of health care, particularly for maternal and child health, in the village. Three respected old women had formerly practised *maw tam yae* in the case study village. They had gained skills and knowledge from their own experience in childbearing as well as learning from other villagers. In 1981, they were given a five-day modern midwifery training course by the district hospital midwives and received a metal

delivery kit consisting of essential tools such as clean scissors, clean cotton cord, gloves and antiseptic solution to be used for assisting delivery of babies. In 1992, only one was still assisting the villagers. The *maw tam yae* accepted that the modern method of delivery was far safer and more convenient than the traditional one. Almost all pregnant women in the village chose to give birth in the hospitals in towns, but practised *you fai* (post-partum resting) at home. The role of the *maw tam yae* in advising and supporting pregnant and post-partum women was still significant. A profile of Mae Paa (a pseudonym), the *maw tam yae* who still assisted the villagers, follows.

Mae Paa, aged 67, was the only *maw tam yae* who still helped at deliveries in the village in 1992. Mae Paa was a physically strong and healthy woman quite large by village standards. She weighed 70 kilograms and stood 167 centimetres tall. She was married with 11 children, all of whom were married and had moved out from the house and started their families elsewhere. Only three stayed in Ban Tha. After her children left home, Mae Paa lived with her 72-year-old husband, making a living by operating a small grocery.

In the past, the villagers had had no access to modern health services. They relied entirely on relatives and traditional practitioners for health as well as delivery of babies. Mae Paa wanted to practise *maw tam yae* because no modern health facilities were available at that time. She learned how to assist other mothers from her own experience. She delivered all her own children by herself and never had any complications. She was confident even the first time she assisted a mother in labour when she was 26, after having had three children. By 1992, she had helped deliver more than 100 babies and had never confronted any difficulty. Although she never asked for pay, she was always given both money and payment in kind. She had assisted her last client three years before. Although she still was willing to help her neighbours, she urged them to seek help from health centres or hospitals instead. She said that some villagers called for help from both the health workers and herself.

In that case she also helped support and massage a mother and helped prepare the ritual ceremony *yu kam or yu fai.*

The same *maw tam yae* also gave massage (*nuead*) for those who suffered from back pain, muscle strain, and pain in other parts of the body. Her clients were not only the villagers, but also people from other villages and towns. I happened to visit her at home, while she was giving massage to a middle-aged woman from another province. Her client had had a terrible neck and shoulder pain for two weeks. Before visiting Mae Paa, she had sought self-medication, but there was no sign of recovery. She visited her daughter and son-in-law in Ban Tha where she happened to learn about Mae Paa from her daughter. Mae Paa was sitting behind her client on a bamboo chair under her house. After discussing her general health problems with her client, she started palpating her client's neck and shoulders and massaged her softly. While she was massaging, she also talked with her client about the client's immediate health problem and other matters. About ten minutes later, her client said that the pain had gone and she looked relieved. She cordially thanked Mae Paa for her help and gave her a 10 *baht* note before she left.

Only one blower (*maw pao*) was recognised in this village. The blower used both incantation and herbal medicine to treat mainly childhood illness in the village. However, herbal medicine was rarely used by the villagers in 1992. The blower also treated bone fractures using palm oil and incantation. This traditional method of bone healing was still practised in the village and regarded as an effective method. I experienced a case which illustrated villagers' beliefs about bonesetting. A 47-year-old woman had broken her left arm in a motorcycle accident. She was immediately taken to the district hospital. After X-ray, the doctor put her arm in a cast which was to be left in place for at least three weeks. She was also admitted to the hospital for two days' observation, but left the same day. After arrived home, she asked her husband to invite the *maw pao* to perform a *yang fai* (roasting beside the fireplace). In the meantime, she cut off the cast. The *maw pao* applied palm oil and chanted holy words onto her arm. On the same day her husband called on the health

personnel to administer an injection. The *yang fai* was carried out on a wooden bed in the kitchen and she was confined there for three days. My second visit to her place was two weeks after the accident. She had already resumed her daily activities except for farm work but she was quite worried about her arm because of pain.

In the past, medicinal plants were abundant and grew wild in the forest. In 1992, they had become scarce and were only available in certain places. Some kinds of herbal medicines could be obtained in the market, but preparing them was considered complicated and inconvenient. The taste, which was also not liked, in part discouraged the use of herbal medicine in the village. I visited one family which had used herbal medicines in the past and still kept bundles of various kinds of herbal medicine wrapped in cotton, that had been untouched for several years. The 70-year old household head said that these medicines were handed down from his parents and were used to treat illness, particularly in children. He and his family members had not used such herbal medicines since they had access to modern health facilities. Apparently, he had even forgotten their names. Modern pharmaceuticals were used by all the family members, including the youngest grand daughter aged three years.

Maw lam phi faa (mediums) were practitioners frequently found in rural villages in the Northeast where religion and superstition are strong and closely tied in with villagers' daily activities. It was believed that many illnesses were caused by evil spirits, so that an appropriate way to treat them was to invite the good spirits to help combat evil spirits. This was a collective ritual ceremony which involved a leader who could communicate with good spirits, one reed musician or *maw kaen*, and four to six dancers. Four women and one *maw kaen* formed the *maw lam phi faa* in the village. I had attended a performance of *maw lam phi faa* while I was staying in the village. A 46-year-old man was suffering from cirrhosis (with jaundice). He had been treated in the provincial hospital for some time, and was told that he was suffering from an incurable disease, cirrhosis. More than 10 villagers had died of the same disease. While he was treated with modern medicine, he also

used herbal medicine. His wife said that his illness cost them a great deal of money; four cattle had already been sold as well as several sacks of rice. Nonetheless, his condition seemed to worsen. In April 1992, he was hospitalised for about two weeks to undergo an operation, but he left the hospital before the operation took place because his relatives and neighbours told him that the operation could do no good. After he returned home, his relatives arranged to have him treated by *maw lam phi faa*. His relatives invited a well-known *maw lam phi faa* from a nearby province to perform treatment. After the treatment, the medium suggested that the illness was caused by an angry spirit and that the patient and relative had to make merit by offering food to the monk.

4.7 Summary

This chapter has described health care services in Thailand and, Ban Tha, the case study village. Despite past and present efforts by governments to improve public health services, they are not very effective. During three decades of the implementation of national economic and social development plans, the public health services as well as the health of the population have improved substantially. However, although infectious diseases and malnutrition are no longer the leading causes of death among the Thais, they remain the major source of ill-health, particularly in the Northeast. This reflects the fact that these dominant causes of ill-health in Thailand today cannot be controlled by curative measures alone. Rather they are functions of socio-economic and environmental conditions that must be addressed as part of a larger process of national development.

The recent expansion of modern health services to rural areas by building more health centres, and district hospitals, and establishing primary health care at the village level has led to an impressive increase in the availability of public health service facilities. Nonetheless, these health facilities are unequally distributed, particularly between Bangkok and the rest of Thailand, and the access gap has widened. Furthermore, building more facilities may not necessarily mean that people will use them. Thailand is not only facing an uneven distribution of health facilities,

but also under-utilisation of village-level health facilities and over-utilisation of high-level health facilities.

The shortcomings in Thailand's public health services are attributed to various factors, important among which is inefficient planning and administration of the health services. Curative care using advanced medical technologies, well-designed hospitals with sophisticated equipment and highly trained doctors have proved to have very little effect on the health of the needy. The over-crowding of people in high-level health facilities, such as provincial or teaching hospitals, and the fact that, paradoxically, very few people use the local health facilities seem to reflect mismanagement of the health system in Thailand. This is not to say that medical intervention has no part to play in improving the health of the population, but this can only be done once the foundation for good health has been laid in the society as a whole. It has been proved in several countries that the health of the poor can be improved impressively when the socio-cultural and other factors are placed in context. With the new direction of health development policy, oriented towards improvement in health and well-being of the majority of people, particularly in rural areas, through strengthening and creating self-reliance, mobilising local resources, using low-cost technology, and focusing on comprehensive approaches, there is, however, reason to hope that these services will run along more efficient lines. The improvement in health care services should be accompanied by improvement in living conditions, provision of clean water and sanitation, good nutrition, mass immunisation, and improved education of mothers and the community as a whole.

CHAPTER FIVE

Extent and nature of utilisation of maternal and child health services

This chapter highlights the extent and nature of utilisation of the maternal and child health care services at two levels: the Northeast region as a whole and the case study village. Qualified health care staff and facilities and services have been provided to the Thai public for decades. For example, in 1987, 62 per cent of rural villages in the Northeast were not more than two kilometres away from government health centres, the average distance from the nearest health centre being three kilometres. This, however, does not ensure that such facilities and services have been totally accepted and are used by local communities. The use of private clinic and private hospitals, though recently exploded in Thailand, will not investigate in the quantitative analysis of the TDHS since no data were available. Co-existence and dual utilisation of both modern and traditional health facilities remain a feature of the health system in Thailand. However, few studies have examined the extent to which health services are being used or identified the factors contributing to their utilisation.

This chapter is divided into three sections. Section 5.1 discusses correlates of the utilisation of maternal and child health services. The TDHS are used to examine the relationships between the utilisation of preventive health care measures and selected explanatory variables. Bivariate and multivariate analysis of the utilisation of preventive health services among ever-married women with children aged 0-59 months was carried out. Each of the four preventive health measures, type of prenatal care, tetanus toxoid injection, type of attendant at delivery, and ownership of health card was analysed separately. Section 5.2 deals with the qualitative data from the case study village which are used to explain mechanisms through with such variables influence utilisation of health services in the context of a rural village. The chapter closes with a discussion and conclusion.

5.1 Correlates of utilisation of health services: data from the TDHS

Before the correlates of preventive health care utilisation are examined, the method of analysis is briefly described. Many factors are known to have influenced whether or not health services are used and what type of health services people prefer. These include demographic, socio-economic, political, and cultural conditions, as well as availability of health services. This study is not able to capture all such aspects due to lack of information. Only variables describing demographic and socio-economic characteristics and availability of modern health facilities are included in the analysis. Each variable describing the utilisation of preventive health measures was subjected to a series of statistical tests which first examined the simple bivariate relationships between the individual utilisation measures and explanatory variables using cross-tabulation. Since the interest of the study is to compare the extent of modern and traditional health care are used, thus each dependent variable was then dichotomised. The dependent variables were dichotomised for the multiple regression analyses as follows: type of prenatal care (modern trained health personnel or others), tetanus toxoid injection (not given or given), type of birth attendant (modern trained health personnel or others), and ownership of health card (stated had health record cards including not seen, or no card).

The explanatory variables related to utilisation of preventive health services were classified into four sets of factors: demographic and socio-economic factors, previous contact with western medical care, and availability of health services. The demographic factors included age of woman and birth order. Socio-economic factors consisted of woman's and her husband's literacy, place of residence, and residence with parents (or presence of parents or in-laws). Use of health services as described above was considered as previous contact with modern medical care. In addition, three variables pertaining to availability of health service were included: type of public health facility in location, distance to nearest health facility, and time to reach nearest health facility.

A parsimonious logistic model was constructed using a hierarchical method to test which variables remained significant. One control variable, place of residence, was introduced to avoid the possible effect of urban bias in the provision of social and health services that may play an important role in use of health services. Two-factor interactions were examined for variables that were significant in the final model. The population attributable risk (PAR) estimates were also performed in multivariate analyses to detect variables that have little explanatory power. The full logistic regression models also contained all significant main effects of the explanatory variables including the control variable (urban-rural residence). The odds ratios, estimates, standard error, t-statistics, and population attributable risks were the parameters included.

Preventive health measures were supposed to be used by women and children during the prenatal, natal, and post-natal periods, and strictly the subsequent measures could not possibly be established as the explanatory variables for any outcomes during preceding periods. For example, the present study legitimately considered variables describing utilisation of prenatal service and tetanus toxoid injection (which occurred during the prenatal period) as explanatory variables for type of attendant at delivery of children.

5.1.1 Type of prenatal care

Bivariate analysis. The age of the woman was used as one of the demographic variables in determining use of prenatal care. It is expected that women of younger (less than 18 years) and older (greater than 35 years) age groups, biologically at high risk of pregnancy and childbirth, would be more likely to visit a prenatal clinic than those of low risk in the middle age groups. However, utilisation of health services is influenced by various factors; among them socio-economic status and availability of health care services are very important. This may enhance the chance of use of prenatal care among the better off and wherever services are available regardless of age of the woman. In addition, the entire set of variables representing utilisation of health services used in this study was self-reported by the

women. This information is subject to both intentional and unintentional bias. For example, women may have responded positively to the questions asked by interviewers, even though their actual practices were otherwise, if they felt that the positive response would have led to better acceptance by interviewers. Previous studies have found inconsistent results in relation to age of women. For example, Rosenstock (1966) studied the pattern of preventive and detection services in the United States and concluded that such services were mostly used by young and middle-aged people. A similar pattern of the utilisation of prenatal clinics was found in Thailand, particularly among the younger age groups (16-25 years) (Boonyanurak, 1985: 59-60). However, the effect of age of woman is not univocal; many studies in a variety of countries (Podell, 1972; Blondel et al., 1980; McDonald and Coburn, 1988: 169) found that older mothers tended to make greater use of prenatal care services. Chernichovsky and Meesook (1986: 616) argued that using age as a measure of demand for medical care was ambiguous partly due to the fact that desire to invest in health decreases as individuals grow older because the span of benefits from such investment decreased with age. Nevertheless, the costs of maintaining a given health status appeared to rise with age. Hence, the old may need less investment in health than the young, but may need more medical attention to maintain their deteriorating health.

Type of prenatal care was classified into three categories in the bivariate analysis. The first two categories (physician, and nurse or midwife) represent modern trained health personnel, while the last (other) included traditional birth attendant and 'did not receive prenatal care at all' (Table 5.1). In general younger women (aged 30 years or younger) were more likely than the older age groups to receive prenatal care from modern trained health personnel. However, the relationship showed no statistical significance. Interestingly, age variations in type of modern trained health personnel were also found. A physician was frequently visited by women in the younger and middle age groups (40 and 45 per cent respectively), while the comparable figure for those aged 35-46 was only 28 per

cent. If the data reflect the actual situation of preferring type of health personnel, if anything the issue of gender may partially explain this variation. Older women in particular may have felt reluctant to visit physicians for pregnancy check-ups since most physicians in Thailand are males. This hypothesis is supported by the relatively high proportion of older women who were seen by a nurse or midwife instead. Females dominate these occupations in Thailand. It is possible also that women may not have been able to correctly classify several types of qualified health professionals. *Maw* (literally 'physician') is generally used for any type of trained health professional or even any hospital staff in Thailand. The classification could have been clearer if the interviewers had used the following terms: *maw yai* (the Thai term for a medical doctor or physician; also this can be identified by gender for *nai phaed* (male physician) and *phaed jing* (female physician) and *maw noi* (other types of health professionals). Although there are official terms such as *phajaabaan* (nurse) and *phadungkha*n (midwife), these have not been widely used.

There are two possible explanations for the high-level of utilisation of prenatal services among younger mothers. First, younger mothers tend to have more knowledge about health services and are more exposed to health information through a variety of communication channels, including formal schooling. Second, younger mothers tend to have higher education than older mothers because university education is a recent phenomenon in developing countries. Recent statistics reveal that the literacy rate for Thai females is more than 90 per cent, as is the rate for males (NSO, 1992: 34).

With regard to variations in birth order, it was hypothesised that women who had experienced a first pregnancy were less likely to visit a health provider for pregnancy check-ups in subsequent pregnancies. Studies in many countries such as the United States (McKinley, 1970; Robinson and Carr, 1978), France (Blondel et al., 1980), and Thailand (Boonyanurak, 1985), found that high parity women were less likely to make use of prenatal care available to them. The results were in agreement with the results of the present study that the birth order of children was

strongly and negatively associated with modern types of prenatal care ($p < 0.001$). During pregnancies leading to first-order live births, most women had been examined by a modern trained health professional (46 per cent by a doctor and 40 per cent by a nurse or midwife), while for the subsequent pregnancies the corresponding figures were much lower (80 per cent for the second and third birth and 70 per cent for fourth or higher birth) for all types of modern trained health providers.

Table 5.1 : Ever-married women with children under five according to type of prenatal care and selected background characteristics, Northeast Thailand, 1987

Characteristics	Type of prenatal care (Percentage)			Number of cases
	Physician	Nurse/midwife	Other	
Age of woman		(LRX2 = 11.18, 6 d.f., p > 0.05)		
16-24	40	41	19	317
25-29	40	41	19	198
30-34	45	28	27	89
35-46	28	46	26	81
Birth order		(LRX2 = 20.2, 4 d.f., p < 0.001)		
First	46	40	14	239
Second or third	40	40	20	210
Fourth or higher	33	38	30	267
Woman's literacy		(LRX2 = 73.79, 4 d.f., p < 0.001)		
Secondary education or higher		52	38	10
319				
Primary-literate	32	42	26	311
Illiterate	21	31	48	86
Husband's literacy		(LRX2 = 117.5, 4 d.f., p < 0.001)		
Secondary education +	73	22	5	145
Primary-literate	32	49	19	365
Primary-illiterate	28	34	38	206
Place of residence		(LRX2 = 89.2, 2 d.f., p < 0.001)		
Urban	74	15	11	144
Rural	31	45	24	572
Lived with parents		(LRX2 = 7.96, 2 d.f., p < 0.02)		
No	41	36	24	469
Yes	37	46	17	247
Overall sample	39	39	22	716

Note: Number of cases may not add to 716 due to missing values.

Source: Subset of the TDHS data tape, 1987.

Most first births occur to young women. Young women are motivated to use prenatal services to safeguard the first baby and themselves. However, mothers who have experienced a normal first pregnancy and birth may gain confidence and view the birth process as a relatively simple matter. They may feel that they can care for themselves or rely on relatives for subsequent pregnancies. A contributory factor may be that public health institutions have a fixed time table for each activity provided. For instance, antenatal care clinics are usually open only on working days. Women who have already had children, particularly young children, may find it hard to attend the clinic at the fixed hours unless child care is arranged. Another possibility is that mothers may have received a bad impression or developed negative attitudes towards health providers or the health program during the previous visits. Whatever their reasons, the proportion of higher parity women who use prenatal care is relatively low.

The TDHS data show that women who made use of prenatal services were distinctively different from those who did not. The education of the women and their husbands was positively and strongly associated with receiving prenatal care from modern trained health providers ($p < 0.001$). Slightly more than half of literate women (52 per cent) visited doctors, compared with only 21 per cent of illiterate women. Only 10 per cent of women in the highest education group did not receive prenatal care of any kind, compared with 48 per cent of illiterate women.

Seventy-three women whose husbands were literate or had higher education used medical professionals for their pregnancy check-ups, but the corresponding figures for women whose husbands were literate with primary education and whose husbands were illiterate were 32 and 28 per cent, respectively ($p < 0.001$). Paramedics, nurses and midwives were an alternative source of prenatal care because they are the primary health resource in rural areas in Thailand. Utilisation of such paramedical staff for pregnancy check-ups was more frequent among women with less educated husbands.

Differences in place of residence (LRX2 = 89.2 with 2 degrees of freedom) and whether couples lived with parents (LRX2 = 7.9 with 2 degrees of freedom) resulted in statistically significant differences in use of prenatal care (Table 5.1). As expected, urban women attended more qualified health providers: 73 per cent visited doctors during their pregnancies, compared with only 30 per cent of rural women. The majority of rural women (45 per cent) relied heavily on the prenatal care provided by nurses or midwives. Almost one-quarter (24 per cent) of women in rural areas, which are relatively disadvantaged, had modern health providers for prenatal care.

Co-residence with parents is a variable relevant to the study of utilisation of health services in many regards; child care substitute during the absence of the mother is among others. In the study on the utilisation of health care among women in a Guatemalan plantation, Cosminsky (1987 : 1170) explained that it is a difficult decision for a mother from a young nuclear family with several small children to visit health facilities at any distance or for long periods of time for medical treatment unless she has someone else (older siblings, mother or mother-in-law) to take care of her children in her absence. In contrast, in a big family a mother tends to obtain relief from her household duties from other household members, therefore enabling her to participate in health care or other activities. In this study, the presence of parents or parents-in-law, defined by whether women lived with parents, was found to have a significant influence on utilisation of health care. Women who lived with parents or parents-in-law accounted for about 83 per cent of those who made use of prenatal care (Table 5.1). The corresponding figure for those who did not live with parents was 76 per cent ($p < 0.02$). One possible explanation for this relates to the time constraints facing women who have a young family with small children. Those living with parents may have access to substitute care for their children and/or assistance with housework so that they can travel to health centres or hospitals. The attitudes of the parents may also influence utilisation of prenatal care. For example, if parents have positive attitudes towards

health providers or modern health care they may motivate their children to use such services. Evidence from the qualitative data supports this claim (see Section 5.2).

All variables pertaining to the availability of health services were found to be strongly associated with the prenatal care women received during their pregnancies in the previous five years (Table 5.2). The type of health facility may play an important role in use of health services as it reflects the equipment and materials used in providing services and the number of providers, as well as the volume and type of medical services provided (Fiedler, 1981: 132). More than 70 per cent of women living in locations that had hospitals were seen by doctors for their pregnancy check-ups. Strikingly, a slightly higher proportion of women from remote areas where there was no health facility at all visited doctors (27 per cent) than those who lived in places where at least a health centre was available (21 per cent), but the key point is that both groups are far below the utilisation of doctors by women from locations that had hospitals. Many women from the places where there was no health facility and the places where a health centre was located, relied on prenatal care provided by a nurse or midwife (46 per cent and 56 per cent respectively). However, the provision of highly qualified health resources did not always guarantee that they were used, as more than 10 per cent of pregnant women in urban areas reported that they received no prenatal care at all.

Distance and travel time to the nearest public health facility also had an impact on the use of prenatal care. The majority of pregnant women visited doctors in the nearest health facility, 72 per cent using the closest in distance and 73 per cent the closest in time. The proportion of pregnant women who visited doctors decreased as distances and travel time to the nearest services increased. In contrast, use of other types of trained health personnel (nurses or midwives) increased as distances and travel time to health services increased. Almost half of women whose nearest facility was a nurse or midwife more than 15 kilometres away and 46 per cent of women for whom travel time was more than one hour attended that facility. Thirty-six per cent of women from the furthest distance category or the

longest time category received no prenatal care at all. The findings suggest that the women were more likely to use prenatal care if the health facility was proximate and convenient with short travel time and distance. The results support the government policy of improving access to health services.

Table 5.2 : Ever-married women of children under five according to type of prenatal care and availability of health services, Northeast Thailand, 1987

Characteristics	Type of prenatal care			Number of cases
	Physician	Nurse/midwife	Other	
Type of public health facility in location (LRX2 = 147.5, 6 d.f., p < 0.001)				
None	27	46	27	357
Health centre	21	56	24	149
Community hospital	71	15	14	66
Hospital (urban area)	74	15	11	144
Distance to nearest health facility (LRX2 = 189.7, 6 d.f., p < 0.001)				
< 6 km to CH or HOS	72	15	13	218
6-10 km to CH or HOS	38	42	20	136
11-15 km to CH or HOS	29	57	14	143
> 15 km to CH or HOS	14	50	36	219
Time to nearest health facility (LRX2 = 147.5, 6 d.f., p < 0.001)				
< 11 min to CH or HOS	73	16	11	199
11-30 min to CH or HOS	32	49	20	167
31-60 min to CH or HOS	28	49	23	201
> 60 min to CH or HOS	17	46	36	149
Overall sample	39	39	22	716

Notes: 1. Number of cases may not add to 716 due to missing values.
2. CH = health centre, HOS = hospital, and min = minutes.

Source: Subset of the TDHS data tape, 1987.

Multivariate analysis. The relationships between use of prenatal care and each of the explanatory variables have been discussed in the foregoing section. Although the pattern of relationships can be drawn from this analysis, it cannot detect the mechanisms through which the variables operate. This leads to the need to carry out multivariate analysis. The type of prenatal care was grouped into two categories: prefessionals (physician, nurse, and midwife) and non-professionals. Only the final logistic regression model which included a control variable (place of residence) and where variables remained significant at the 5 per cent level is presented (Table 5.3). The following conditions were found to reduce the

likelihood of receiving professional prenatal care after controlling for the effect of place of residence: lower levels of education for women (particularly illiteracy); lower levels of education for husbands (particularly illiteracy); longer travel times; and non-residence with parents. The population attributable risks (PAR) corresponding to those base categories were all less than 0.95, confirming that all the variables contributed to significant increases in the likelihood of receiving prenatal care.

Table 5.3 : Logistic regression parameters relating explanatory variables to type of prenatal care women received during their pregnancy in the previous five years, Northeast Thailand, 1987

Variables	Estimates	SE	t-statistic	Odds ratio	PAR
Place of residence	(LRX2 = 12.7, 1 d.f., $p < 0.001$)				0.69
Urban	0.00	-	-	1.00	
Rural	0.62	0.55	1.12	1.86	
Women literacy	(LRX2 = 51.2, 2 d.f., $p < 0.001$)				0.52
Secondary or higher	0.00	-	-	1.00	
Primary-literate	-0.71	0.25	-2.78	0.49	
Illiterate	-1.53	0.32	-4.68	0.22	
Husband literacy	(LRX2 = 23.5, 2 d.f., $p < 0.001$)				0.63
Secondary or higher	0.00	-	-	1.00	
Primary-literate	-1.28	0.47	-2.69	0.28	
Illiterate	-2.01	0.49	-4.08	0.13	
Time to nearest health facility	(LRX2 = 9.8, 2 d.f., $p < 0.01$)				0.24
< 11 min HC or HOS	0.00	-	-	1.00	
11-60 min HC or HOS	-0.47	0.47	-1.00	0.62	
> 60 min HC or HOS	-1.12	0.49	-2.27	0.33	
Lived with parents	(LRX2 = 5.4, 1 d.f., $p < 0.05$)				0.11
No	0.00	-	-	1.00	
Yes	0.51	0.22	2.28	1.67	

Notes:
1. SE refers to standard error of the estimates.
2. LRX2 (Likelihood Ratio Chi-square) and degree of freedom (d.f.) are reductions in scale deviance and degrees of freedom when a variable was added into the model step by step.
3. HC = health centre and HOS = hospital.
4. Place of residence is used as a control variable.
5. PAR denotes the Population Attributable Risk, and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.

Source: TDHS data tape, 1987.

Place of residence emerged as a highly significant variable in the bivariate analysis ($p < 0.001$). More urban than rural women received prenatal care provided

by health professionals. However, when adjusted for the influence of other variables, the differential between urban and rural women was no longer statistically significant. This result suggests that utilisation of prenatal care in different places of residence operates through other factors characterising the population and place of residence. Such important characteristics as education, co-residence with parents and easy access to health services were among the factors that acted directly on utilisation of health services in the study.

Education of woman and her husband was found to be the most significant variable affecting the use of prenatal services ($p < 0.001$). The odds ratios for women's and husband's education were all less than one and there were statistically significant variations in each category (t-statistics were less than -1.96). The odds ratio for use of prenatal care for illiterate women was 0.22 times that of secondary or higher educated women. A strong influence of maternal education on utilisation of prenatal health care was also found in studies in Thailand (see for example, Kanavacharakul, 1989; Jintanothaithavorn, 1993; and Leoprapai et al., 1994). McClain (1977), among others, explained a possible pathway through which education acts upon utilisation of modern health services. He suggested that educated women are more confident and exposed to new ideas and the outside world. As a result, they are more likely to use health services than uneducated women. However, in the context of Northeast Thailand, particularly in rural villages, most women received only compulsory education (four years of schooling before 1980 and six years between 1980 and 1993), and thus had similar educational backgrounds (Chapter Four, Section 4.2). Better educated women were likely to come from better off families. Thus, their family background may have had more influence on their attitudes and behaviour than education *per se*.

Travel time to the nearest public health facility also remained significant when adjusted for the effect of other variables ($p < 0.01$). This variable was reclassified into three categories in the multivariate analysis (Table 5.3). The utilisation of prenatal care was greatest for the shortest travel times (particularly

less than one hour). Women least likely to use prenatal services were those who had to travel longer than one hour to reach the nearest health facility, the odds for this group being 0.33 times the value for the reference group after controlling for other variables.

Women who lived with parents were about 77 per cent more likely to use available prenatal care services than those women who lived separately from parents. This suggests that availability of kin or family during pregnancy is advantageous, because other women in the household provide substitute child care and substitute labour for housework.

5.1.2 Tetanus toxoid injection

The previous section has examined the relationship between selected sets of explanatory variables and the proportion of women receiving prenatal care. This section investigates the factors associated with whether or not women received tetanus toxoid injections during those pregnancies leading to live births during the five years prior to the survey. Tables 5.4 and 5.5 present cross-tabulations of selected explanatory variables and tetanus toxoid injection while the logistic model is presented in Table 5.6.

Bivariate analyses. The following conditions were found to be associated with a higher level of tetanus toxoid injection: younger age of women; lower birth order; literacy (of both women and their husbands); living with parents; utilisation of prenatal care; and shorter distances and travel time to nearest health facility. Three variables were not significant at the 5 per cent level: age of woman, place of residence, and type of public health facility in the locality.

Unexpectedly, place of residence and the type of public health services at the locations were found to have no effect on whether women received a tetanus toxoid injection. As discussed in Chapter Four, Section 4.3 there are a number of reasons that explain this result. Rural women may have overstated tetanus injections due to confusion with other injections which are frequently given in the

Northeast. The data do show that a higher proportion of urban women received tetanus toxoid injection, compared to 72 per cent for rural women (Table 5.4).

Table 5.4 : Ever-married women of children under five by self-reported receipt of a tetanus toxoid injection and selected background characteristics, Northeast Thailand, 1987

Characteristics	Tetanus toxoid injection		Number of cases
	Not given	Given	
Age of woman	(LRX2 = 7.46, 3 d.f., p > 0.05)		
16-24	22	78	307
25-29	23	77	189
30-34	30	70	86
35-46	36	64	73
Birth order	(LRX2 = 27.48, 2 d.f., p < 0.001)		
First	17	83	239
Second	23	77	210
Third or more	37	63	267
Woman's literacy	(LRX2 = 89.1, 3 d.f., p < 0.001)		
Illiterate	59	41	86
Primary-illiterate	31	69	311
Primary-literate	16	84	238
Secondary or higher	4	96	81
Husband's literacy	(LRX2 = 55.58, 2 d.f., p < 0.001)		
Illiterate	42	58	206
Primary-literate	24	76	365
Secondary or higher	8	92	145
Place of residence	(LRX2 = 2.8, 1 d.f., p > 0.05)		
Urban	21	79	144
Rural	28	72	572
Living with parents	(LRX2 = 9.37, 1 d.f., p < 0.05)		
No	30	70	469
Yes	19	81	247
Overall sample	26	74	716

Note: Number of cases may not add to 716 due to missing values.

Source: Subset of the TDHS data tape, 1987.

High birth order had a negative impact on whether women received tetanus toxoid injection ($p < 0.001$). More women reported receiving a tetanus toxoid injection during the pregnancy leading to the birth of a first child (83 per cent), but the corresponding figures for second birth order and subsequent pregnancies were 77 and 63 per cent respectively. This is not surprising because pregnant women would not be injected if they had been previously immunised and the subsequent pregnancies occurred within the protection period of the vaccine (normally about

three years). This also probably reflected lower utilisation of prenatal care among higher birth orders as previously discussed in Section 5.1.1.

The education of the women and their husbands had a strongly positive effect on women receiving a tetanus toxoid injection ($p < 0.001$). Almost all women with secondary or higher education were immunised (96 per cent), whereas the corresponding figure for illiterate women was slightly less than one-third (34 per cent). Similar strong patterns were also found for husband's education.

Living with parents was also positively associated with tetanus injections: women who lived with parents were about 10 per cent more likely to receive the injection. This may reflect more frequent utilisation of prenatal clinics among women who lived with parents than those who did not.

The previous use of prenatal care was strongly association with whether women received a tetanus toxoid injection ($p < 0.001$). Nearly all women who received prenatal care from modern health providers (doctors and nurses or midewives) were given a tetanus toxoid injection, while only 14 per cent of women who had not received prenatal care reported having a vaccination (Table 5.5).

Distance and travel times to the nearest public health facility were important variables influencing whether pregnant women received a tetanus toxoid injection. The distance to the nearest health services was found to be highly associated with vaccination ($p < 0.001$). The most marked difference in the proportion of women who were immunised was found in the longest distance category (more than 15 kilometres), in which less than two-thirds of women were immunised. The patterns of immunisation were quite consistent for the travel time variable. The highest proportion of women (80 per cent) who received the vaccine was found in the first category (travel time less than 11 minutes). However, it did not make much difference whether the travel time was 11-30 minutes or 31-60 minutes. However, a substantial difference was found where the travel time was more than one hour (only 62 per cent of these women were immunised).

Table 5.5 : Ever-married women of children under five by self-reported receipt of a tetanus toxoid injection and availability of health services, Northeast Thailand, 1987

Characteristics	Tetanus toxoid injection (%) Not given	Given	Number of cases
Type of prenatal care	(LRX2 = 338.9, 2 d.f., p < 0.001)		
Physician	11	89	281
Nurse/midwife	9	91	280
Other or none	86	14	155
Type of public health facility in location	(LRX2 = 7.59, 3 d.f., p > 0.05)		
None	30	70	357
Health centre	26	74	149
Community hospital	18	82	66
Other hospital (urban area)	21	79	144
Distances to nearest health facility	(LRX2 = 17.5, 3 d.f., p < 0.001)		
< 6 km to HC or HOS	22	78	218
6-10 km to HC or HOS	24	76	136
11-15 km to HC or HOS	20	80	143
> 15 km to HC or HOS	37	64	219
Time to get to nearest health facility	(LRX2 = 14.2, 3 d.f., p < 0.01)		
< 11 min to HC or HOS	20	80	199
11-30 min to HC or HOS	26	74	167
31-60 min to HC or HOS	25	75	201
> 60 min to HC or HOS	38	62	149
Overall sample	26	74	716

Notes: 1. HC = health centre, HOS = hospital, and min = minutes.

Source: Subset of the TDHS data tape, 1987.

Multivariate analysis. The use of modern health providers and women's education were associated with increased vaccination after controlling for place of residence. No interaction effect for these variables was found at the 5 per cent level of significant (Table 5.6). The use of modern trained health providers increased the odds of receiving a tetanus toxoid injection. Women's education was also an important predictor of receiving a tetanus toxoid injection. The odds relative to women's education were all greater than one, and for the highest education category were highly significant (odds ratio = 12.68). Although the variables pertaining to access to health services, distance to the nearest health facility, and travel time to nearest health facility were significant at the bivariate level, none of these variables was statistically significant after controlling for other variables.

Table 5.6 : Logistic regression parameters relating explanatory variables to women's receipt of a tetanus toxoid injection during pregnancies in the previous five years, Northeast Thailand, 1987

Variables	Estimates	SE	t-statistic	Odds ratio	PAR
Place of residence	(LRX2 = 4.5, 1 d.f., $p < 0.05$)				0.48
Urban	0.00	-	-	1.00	
Rural	0.66	0.36	1.83	1.93	
Prenatal care	(LRX2 = 316.2, 1 d.f., $p < 0.001$)				0.06
Physician/nurse	0.00	-	-	1.00	
Other	-3.89	0.30	-12.97	0.02	
Women's literacy	(LRX2 = 25.6, 3 d.f., $p < 0.001$)				0.81
Illiterate	0.00	-	-	1.00	
Illiterate & primary	0.84	0.37	2.27	2.32	
Literate & primary	1.76	0.43	4.09	5.81	
Secondary or higher	2.54	0.73	3.48	12.68	

Notes: 1. SE refers to the standard error of the estimates.
2. Likelihood Ratio Chi-square (LRX2) and d.f. are reductions in scale deviance and degree of freedom when variables were added into the model step by step.
3. Place of residence is treated as a control variable.
4. PAR denotes Population Attributable Risk, and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.

5.1.3 Type of birth attendant

In this section several variables are hypothesised to influence choice of birth attendant, including demographic and socio-economic characteristics, access to health facilities, co-residence with parents, and previous use of modern health facilities. Bivariate analysis, in the form of cross-tabulations is presented in Tables 5.7 and 5.8. Overall, about half of the births that took place during the five years preceding the survey were assisted by modern health providers (33 per cent by doctors and 24 per cent by nurses or midwives) and the other half were assisted by others (32 per cent by traditional birth attendants and 10 per cent by relatives or others). All selected explanatory variables, except for whether the women lived with parents, were found to be strongly associated with type of attendant at delivery.

Bivariate analysis. Although age of woman was associated with type of birth attendant when this variable was classified into four categories ($p < 0.01$), the variations in type of birth attendant were rather inconsistent (Table 5.7). Younger

women (aged 34 years or younger) were more likely than older women (35 years or older) to be assisted by modern health providers combined during delivery. The utilisation of traditional birth attendants was relatively high among the Northeastern women, particularly women under aged 35 years, as more than 30 per cent were assisted by traditional birth attendants. As many as 36 per cent of women aged 16-24 years were assisted by traditional birth attendants, compared with only 22 per cent among the older women (aged 35-46 years). A striking difference was observed for those who were assisted by others including relatives or none. As many as 24 per cent of the high risk group (35-46 years) had delivered with assistance provided by relatives.

As was the case with the utilisation of prenatal care, birth order was inversely associated with the use of health professionals during delivery ($p < 0.001$). Trained health professionals helped to deliver the majority of first births: 39 per cent were helped by doctors and 29 per cent by nurses or midwives (Table 5.7). One possible explanation was that less experienced mothers were motivated to use qualified health providers. They may have been more aware of the complications which would occur during pregnancies and/or childbirth. Since they were more likely to use prenatal services, health information that they obtained from prenatal clinics may have influenced their decision ask for assistance from modern health providers during childbirth.

Contraceptive practice may also have influenced the choice of delivery attendant. Female sterilisation is the most common contraceptive method currently practised in Thailand. Over one-third of women with two children and half of those with three children are protected by sterilisation (Pitaktepsombati and Janowitz, 1989: 156). The prevalence of female sterilisation was 22 per cent for the country as a whole and 25 per cent for the Northeast (Chayovan et al., 1988: 55 and 59). Two types of tubal ligation, 'postpartum or wet' and 'non-postpartum or dry' sterilisations, can be performed. Most female sterilisation in Thailand are postpartum sterilisations (Pitaktepsombati and Janowitz, 1989: 148), where the

operation can be performed soon after giving birth. However, the operation is only available in a hospital or a private clinic in town. Couples decide to undergo the operation when they have attained the desired number of children, usually two or three (the total fertility rate of Thai women was 2.2 in 1987). Therefore, the delivery of the last child (usually the third child) is more likely to take place in an institutional setting.

Table 5.7 : Ever-married women with children under five according to type of attendant at delivery of children and demographic and socio-economic background, Northeast Thailand, 1987

Characteristic	Type of attendant at birth of children (%)				Number
	Doctor	Nurse/midwife	TBA	Other	of cases
Age of woman	(LRX2 = 25.84, 9 d.f., p < 0.01)				
16-24	30	27	36	7	317
25-29	39	21	31	9	198
30-34	38	21	34	7	89
35-46	28	26	22	24	81
Birth order	(LRX2 = 60.98, 12 d.f., p < 0.001)				
First	39	30	26	5	239
Second	32	20	39	9	210
Third	35	27	33	5	129
Fourth	28	20	37	15	65
Fifth or higher	21	15	30	34	73
Woman's literacy	(LRX2 = 128.7, 9 d.f., p < 0.001)				
Illiterate	22	12	54	13	86
Primary and illiterate	25	22	40	13	311
Primary and literate	35	31	25	8	238
Secondary or higher	73	25	1	1	81
Husband's literacy	(LRX2 = 126.5, 6 d.f., p < 0.001)				
Illiterate	23	18	44	15	206
Primary and literate	27	26	37	11	365
Secondary or higher	64	28	5	3	145
Place of residence	(LRX2 = 148.5, 3 d.f., p < 0.001)				
Urban	71	22	2	5	144
Rural	24	24	40	12	572
Living with parents	(LRX2 = 2.21, 3 d.f., p > 0.05)				
No	35	22	32	10	469
Yes	31	27	33	10	247
Overall sample	34	24	32	10	716

Note: TBA refers to traditional birth attendant.

There was a statistically significant relationship between level of education of the woman and type of birth attendant used. One-third (34 per cent) of illiterate

women were delivered by modern health personnel of some kind. In contrast, almost all women with secondary education or higher (97 per cent) used modern health personnel for childbirth (Table 5.7). Perhaps the better educated women and their husbands were more aware of the advantages of modern birth services and, therefore, preferred to use trained health personnel during delivery. Ninety-two per cent of women whose husbands had secondary or higher education used modern health providers. On the other hand, 59 per cent of women whose husbands had only primary education and could read only with difficulty used traditional birth attendants.

Place of residence was strongly related to the type of birth attendant used ($p < 0.001$). It might be hypothesised that women who lived in urban areas, where there is better access to modern health facilities and more exposure to and knowledge about such services, would use modern rather than traditional health services. The data support this hypothesis. The majority of urban women (93 per cent) were attended by some kind of modern health providers, in contrast to only 48 per cent of rural women. In rural areas, where modern health facilities were less accessible, women relied heavily on the assistance provided by traditional birth attendants.

It was anticipated that a woman who lived in the same house with her parents or parents-in-law might be influenced by them to use a traditional birth attendant instead of the modern health providers for delivery. A woman who lived separately from parents might be less bound by customary practices. However, the data showed no significant effect of residence with parents on the type of birth attendant used. This suggests that parents or parents-in-law did not have a strong influence on an expectant woman's choice of delivery attendant.

The type of prenatal care attendant used by a woman before childbirth might be expected to exert the strongest influence on the type of delivery assistant she would use. For instance, if a mother frequently used modern health providers during the prenatal period, she might continue to use modern health providers at

delivery. Therefore, two variables were used to represent previous health care experiences: type of prenatal care used and whether tetanus toxoid injection was received during pregnancies leading to live births in the previous five years. Sixty-five per cent of women who received prenatal care from doctors also sought help from doctors during deliveries (Table 5.8). In contrast, only 20 per cent of women who had traditional prenatal care used modern health providers at delivery. There was a highly statistically significant association between type of prenatal care and type of birth attendant used ($p < 0.001$), confirming the hypothesis that the type of prenatal care had a strong influence on a woman's choice of childbirth attendant.

Table 5.8: Ever-married women with children under five according to type of attendant at delivery of children and availability of health services, Northeast Thailand, 1987

Characteristic	Type of attendant at birth of children (%)				Number
	Doctor	Nurse/midwife	TBA	Others	of cases
Type of prenatal care	(LRX2 = 289.1, 6 d.f., $p < 0.001$)				
Physician	65	18	16	2	281
Nurse/midwife	14	39	34	13	280
Other	13	7	60	20	155
Given tetanus toxoid injection	(LRX2 = 75.7, 3 d.f., $p < 0.001$)				
Not given	20	11	51	19	188
Given	38	28	26	7	528
Type of public health facility in location	(LRX2 = 214.3, 9 d.f., $p < 0.001$)				
None	22	23	43	12	357
Health centre	11	30	44	14	149
Community hospital	64	17	17	3	66
Hospital (urban area)	71	22	2	5	144
Distance to nearest health facility	(LRX2 = 231.6, 9 d.f., $p < 0.001$)				
< 6 km to HC or HOS	67	21	8	5	218
6-10 km to HC or HOS	21	23	50	7	136
11-15 km to HC or HOS	27	39	25	10	143
> 15 km to HC or HOS	13	18	51	18	219
Time to nearest health facility	(LRX2 = 189.7, 9 d.f., $p < 0.001$)				
< 11 min to HC or HOS	68	22	7	4	199
11-30 min to HC or HOS	19	23	46	11	167
31-60 min to HC or HOS	26	27	39	9	201
> 60 min to HC or HOS	14	24	43	20	149
Overall sample	34	24	32	10	716

Notes: 1. Number of cases may not add to 716 due to missing values.
2. TBA refers to traditional birth attendant.
3. HC = health centre, HOS = hospital, and min = minutes.

Source: Subset of the TDHS data tape, 1987.

The other variable describing health care experience of women was whether they had received tetanus toxoid injection during pregnancies leading to births in the five years preceding the survey. Among vaccinated women, 66 per cent used modern health providers during delivery, but 69 per cent of non-vaccinated women used a traditional birth attendant. The association was highly significant, with $p < 0.001$.

Although the data showed a strong relationship between the type of public health facility in the location and the type of birth attendant, the differences were not as expected. It was anticipated that women who lived in a place where a modern health facility was available would be more likely to seek assistance from trained health providers. The majority of women from both places relied on traditional birth attendants (55 per cent for no health facility and 58 per cent for a health centre). A marked difference was only found if the women lived close to hospitals; 80 per cent and 93 per cent of women from places where there were community hospitals and other hospitals respectively used trained health providers (Table 5.8). This suggests that community-based health centres had little influence on choice of birth attendant. The persistent use of traditional birth attendants even where modern health services were available may reflect a negative outlook towards trained health providers, particularly the local health providers. For instance, rural women may view the modern birth attendants as less capable, less experienced, and much younger than the traditional birth attendants. Therefore, rural women might be more inclined to use the traditional midwives than modern trained midwives.

Distance to the nearest public health facility is an important indicator of availability. It was anticipated that the further a woman lived from a public health facility, health centre or hospital, the greater would be the tendency for her to use a traditional birth attendant. There was indeed a negative association between distance and type of birth attendant used ($p < 0.001$): 88 per cent of women who lived within five kilometres of a hospital or health centre used trained health

providers, compared with only 31 per cent of those who lived further than 15 kilometres from public health facilities (Table 5.8).

A similar result was found for travel time to the nearest public health facility. About 90 per cent of women with the shortest travel times used a modern birth attendant, compared with only 62 per cent of those who had to travel longer than one hour ($p < 0.001$).

Multivariate analysis. Since the interest of this study is to compare the extent of utilisation of modern and traditional health care patterns, type of birth attendant was dichotomised accordingly in multivariate analysis. The logistic regression model for type of birth attendant used is shown in Table 5.9. Five explanatory variables remained significant after controlling for the place of residence. In order of significance, these were type of prenatal care attendant, distance to the nearest public health facility, husband's literacy, woman's literacy, and tetanus toxoid injection. Women had decreased odds of using a modern birth attendant if they had used a traditional birth attendant for prenatal care. Distance to the nearest public health facility was consistently associated with type of birth attendant used, the odds of a modern birth attendant decreasing substantially with distance. Women who lived more than 15 kilometres from a health facility were 0.20 times as likely as those who lived in location where health services were available to seek assistance from modern birth attendants. The effects of husband's education and type of birth attendant were also consistent, but significant only in comparison between the higher education and illiterate groups. After controlling for all variables, the intermediate group, primary education and literate, did not show a significant variation from the higher education group in using modern birth attendants. The effect of the women's education on use of modern birth attendant became weaker in the final model, although it remained significant ($p < 0.05$). The odds of using modern birth attendants among illiterate women were 0.66 times those of secondary or higher educated women, but the relationship was not statistically significant (t-statistic = -1.20). A significant relationship existed for women who received tetanus toxoid during their pregnancies (odds ratio = 1.88).

The interaction terms between place of residence and husband's literacy, even though significant ($p < 0.05$), were omitted from the final model, because it was not possible to determine whether the individual interaction categories were significantly positive or negative.

Table 5.9 : Logistic regression parameters relating explanatory variables and type of birth attendant in the previous five years, Northeast Thailand, 1987

Variables	Estimates	SE	t-statistic	Odds ratio	PAR
Place of residence	(LRX2 = 105.0, 1 d.f., $p < 0.001$)				0.42
Urban	0.00	-	-	1.00	
Rural	-1.82	1.06	-1.72	0.16	
Type of prenatal care	(LRX2 = 114.7, 2 d.f., $p < 0.001$)				
0.22					
Physician	0.00	-	-	1.00	
Nurse/midwife	-0.56	0.23	-2.43	0.57	
Other or none	-1.66	0.36	-4.61	0.19	
Distance to nearest health facility	(LRX2 = 23.2, 2 d.f., $p < 0.001$)				0.71
< 6 km to HC and HOS	0.00	-	-	1.00	
6-15 km to HC and HOS	-0.91	0.35	-2.60	0.40	
> 15 km to HC and HOS	-1.60	0.38	-4.21	0.20	
Husband's literacy	(LRX2 = 18.1, 2 d.f., $p < 0.001$)				0.86
Secondary or higher	0.00	-	-	1.00	
Primary and literate	-0.91	1.20	-0.76	0.40	
Illiterate	-3.25	1.16	-2.80	0.04	
Women's literacy	(LRX2 = 6.2, 2 d.f., $p < 0.05$				0.81
Secondary or higher	0.00	-	-	1.00	
Primary and literate	-0.47	0.22	-2.14	0.62	
Illiterate	-0.41	0.34	-1.20	0.66	
Tetanus toxoid injection	(LRX2 = 3.9, 1 d.f., $p < 0.05$)				0.80
Not given	0.00	-	-	1.00	
Given	0.63	0.30	2.10	1.88	

Notes:
1. SE refers to the standard error of the estimates.
2. HC = health centre, HOS = hospital.
3. LRX2 and d.f. are reductions in scale deviance and degree of freedom when a variable is added to the model step by step.
4. Place of residence is a control variable.
5. PAR denotes Population Attributable Risk, and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.

In summary, a significant effect of previous contact with modern health resources on choice of childbirth practices was observed in this study. Women who received modern prenatal care tended to seek assistance from modern health services for childbirth. Such women may have developed positive attitudes towards modern health services during their initial visits, and therefore, sought help

from modern health providers for subsequent health needs. The lack of a significant difference in use of modern birth attendant between the highest and lowest education groups suggests that there may be a different explanation for use of health services among uneducated and highly educated groups. A study in Indonesia by Streatfield et al. (1990), which also found no difference in use of immunisation between children whose mothers had 0-2 years and 7 or more years of education offered a sociological explanation. They suggested that education *per se* played an important role only if women had received at least some secondary education while conformity to local authority led the uneducated women to bring their children to be immunised.

5.1.4 Ownership of health record cards

A different set of explanatory variables was examined in relation to the ownership of health record cards for children because the ownership of health cards represents a current situation. The explanatory variables examined therefore reflected the current circumstances of the individual and family, including occupation of the mother and father, household possessions, source of water, and household sanitation. The percentage distributions of children under age five according to these explanatory variables are presented in Tables 5.10, 5.11, and 5.12. The results of a multivariate logistic regression are presented in Table 5.13 including the control variables (age of child and place of residence) and variables that remained significant at the 5 per cent level.

Bivariate analysis. Only 24 per cent of mothers (of 682) were able to present their children's health record cards to interviewers and nine per cent reporting having had health record cards that were lost. As discussed in Section 4.5 of Chapter Four, children whose mothers reported having had health record cards, regardless of whether they were able to present them to the interviewers or not, were considered as owning health record cards. There was a slight variation in the sex distribution of children having health record cards, 31 per cent for boys and 35 per cent for girls (Table 5.10). More younger children, particularly children under

24 months, had health record cards compared with older children. Only 20 per cent of older children (48-59 months) had health record cards ($p < 0.001$). The effect of mother's age on ownership of health record cards was not linear. Children whose mothers were aged 20-39 were more likely to own a health record card than those whose mothers were younger (particularly 15-19) or older (particularly 40-49). With respect to number of siblings, children from smaller families were more likely to own health cards: 40 per cent for one-child families, in contrast to only 16 per cent for families with those with five or more children ($p < 0.05$).

Table 5.10: Children aged 0-59 months owning health record cards by demographic characteristics, Northeast Thailand, 1987

Characteristics	Percentage having health cards		Number of cases
	No	Yes	
Child's sex	(LRX2 = 1.12, 2 d.f., $p > 0.05$)		
Male	69	31	341
Female	65	35	341
Age of child	(LRX2 = 30.67, 4 d.f., $p < 0.001$)		
0-11	52	48	127
12-23	59	41	145
24-35	71	29	135
36-47	71	29	133
48-59	80	20	142
Current age of mother	(LRX2 = 12.47, 5 d.f., $p < 0.05$)		
15-19	70	30	37
20-24	65	35	188
25-29	66	34	199
30-34	63	37	147
35-39	66	34	58
40-49	87	13	53
Number of living siblings	(LRX2 = 13.07, 4 d.f., $p < 0.05$)		
One	60	40	173
Two	66	34	246
Three	68	32	142
Four	72	28	64
Five or more	84	16	57
Overall	67	33	682
	(457)	(225)	

Note: Number of cases may not add to 682 due to missing values.

All socio-economic variables, except for residence with parents, were strongly associated with ownership of child health cards (Table 5.11). The education of both the mothers and fathers was consistently associated with possession of health cards. The higher the education of the mother or the father,

the more likely the children owned health record cards ($p < 0.001$). The occupation of mothers and fathers was also related to ownership of a health card. The highest proportion of children reported as having health record cards was those whose mothers (54 per cent) and fathers (58 per cent) were engaged in white-collar occupations. The corresponding figures for children whose mothers and fathers engaged in agricultural work were 25 per cent for both variables. The relatively low proportion of children with health record cards (32 per cent) was also found among those whose mothers were not working at the time of the survey. Whether the mother lived with parents or not had no statistically significant association with ownership of health cards.

A positive statistical association was found between ownership of a health card and household possessions, defined as ownership of a radio, a television set, a refrigerator, and a motorcycle. Health card ownership was higher among children from households that owned radios, television sets, refrigerators, or motorcycles. The effects of source of drinking water and possession of a latrine on ownership of health record cards were also significant. Only 25 per cent of children whose households relied on water from wells compared with 54 per cent for those whose water supply was taken from piped or tap water ($p < 0.001$). Both sets of variables reflect the socioeconomic status of the family. For example, households that could afford to have a latrine were usually better off. Better drinking water, especially piped water, was only available in urban areas where other health and social welfare facilities were also easily accessible. Moreover, members of those households were probably more exposed to modern knowledge and ideas, which also influence the utilisation of health services.

The health care experiences of mothers, in terms of prenatal care attendance, tetanus toxoid injection, and type of birth attendant, were all strongly associated with having health cards ($p < 0.001$) (Table 5.12). About half the children whose mothers were attended by doctors had health cards compared with only 14 per cent for those whose mother did not received prenatal care. A similar pattern of ownership of health record cards was also found for the type of birth attendant. Only 14 per cent of births

attended by traditional birth attendants were reported as having health cards. One-third of children whose mothers received a tetanus toxoid injection had health cards, whereas the corresponding figure for the non-vaccinated mothers was only 18 per cent. It could be inferred that such women had to some extent been satisfied with modern health care services during the prenatal and post-natal period, and that this influenced the subsequent use of health care services for their children.

The results in Table 5.12 also show that all variables pertaining to access to health services were highly correlated with ownership of health cards ($p < 0.001$). However, the effect of the type of public health facility available in the location on ownership of health cards was not entirely as expected. Only 22 per cent of children who lived in locations where health centres were available had health cards. However, this proportion was even lower than for locations where there was no health facility available, where it was 27 per cent. The availability of hospitals seems to have had a strong effect on the ownership of health cards, 43 and 55 per cent of children owning cards in locations with a community hospital and other hospital, respectively.

Table 5.11 : Children aged 0-59 months owning health record cards by socio-economic background, Northeast Thailand, 1987

Characteristics	Percentage having health card No	Yes	Number of cases
Mother's education	(LRX2 = 30.9, 3 d.f., p < 0.001)		
Illiterate	82	18	78
Primary and illiterate	72	28	296
Primary and literate	63	37	228
Secondary or higher	45	55	80
Father's education	(LRX2 = 44.25, 2 d.f., p < 0.001)		
Primary and illiterate	74	26	189
Primary and literate	73	27	353
Secondary or higher	43	57	140
Mother's occupation	(LRX2 = 17.8, 4 d.f., p < 0.001)		
White collar	46	54	37
Blue collar	53	47	68
Services or unskilled manual	71	29	21
Agriculture	75	25	149
Not working	68	32	407
Father's occupation	(LRX2 = 35.3, 3 d.f., p < 0.001)		
White collar	43	57	40
Blue collar	54	46	125
Service or unskilled manual	56	44	80
Agriculture	75	25	437
Currently living with parents	(LRX2 = 2.98, 1 d.f., p > 0.05)		
No	69	31	443
Yes	63	37	239
Place of residence	(LRX2 = 35.4, 1 d.f., p < 0.001)		
Urban	45	55	134
Rural	72	28	548
Household possession of radio	(LRX2 = 14.01, 1 d.f., p < 0.001)		
No	76	24	248
Yes	62	38	434
Household possession of television set	(LRX2 = 34.7, 1 d.f., p < 0.001)		
No	74	26	467
Yes	51	49	215
Household possession of refrigerator	(LRX2 = 37.4, 1 d.f., p < 0.001)		
No	72	28	576
Yes	41	59	106
Household possession of motorcycle	(LRX2 = 16.4, 1 d.f., p < 0.001)		
No	71	29	520
Yes	54	46	162
Source of drinking water	(LRX2 = 28.4, 2 d.f., p < 0.001)		
Piped or tap water	46	54	93
Rain water	60	40	144
Well or others	73	27	445
Owns latrine	(LRX2 = 30.2, 2 d.f., p < 0.001)		
No	77	23	332
Yes	57	43	350
Overall	67 (457)	33 (225)	682

Note: Number of cases may not add to 682 due to missing values.

Source: Subset of the TDHS data tape, 1987.

The distances and travel times to the nearest health facility were both associated with ownership of health cards. The shorter the distance or the travel time to a health facility, the more likely the children were to be reported as having health cards. However, there was little difference in the proportion of children owning health cards beyond a distance of more than five kilometres or beyond a travel time of longer than ten minutes from the nearest health facility.

Table 5.12: Children aged 0-59 months owning health record cards by availability and use of health services, Northeast Thailand, 1987

Characteristics	Percentage having health cards No	Yes	Number of cases
Given tetanus vaccine during pregnancy	(LRX2 = 23.1, d.f., p < 0.001)		
No	81	19	172
Yes	62	38	510
Prenatal care during last pregnancy	(LRX2 = 50.5, 2 d.f., p < 0.001)		
Physician	53	47	271
Nurse/midwife	71	29	270
Other or none	86	14	141
Attendant at delivery of last born child	(LRX2 = 43.8, 3 d.f., p < 0.001)		
Physician	52	48	229
Nurse/midwife	67	33	167
Traditional birth attendant	79	21	222
Other or none	81	19	64
Type of public health facility	(LRX2 = 44.5, 3 d.f., p < 0.001)		
None	73	27	340
Health centre	78	22	145
Second class health centre	57	43	63
Hospital	45	55	134
Distance to nearest health facility	(LRX2 = 44.6, 3 d.f., p < 0.001)		
< 6 km to HC or HOS	49	51	213
6-10 km to HC or HOS	78	22	122
11-15 km to HC or HOS	71	29	142
> 15 km to HC or HOS	76	24	205
Time taken to nearest health facility	(LRX2 = 47.1, 3 d.f., p < 0.001)		
< 11 min to HC or HOS	46	54	177
11-30 min to HC or HOS	72	28	171
31-60 min to HC or HOS	72	28	194
> 60 min to HC or HOS	79	21	140
Overall	67 (457)	33 (225)	682

Notes: 1. Number of cases may not add up to 682 due to missing values.
2. HC = health centre, HOS = hospital, and min = minutes.

Source: Subset of the TDHS data tape, 1987.

Multivariate analysis. The logistic regression model is shown in Table 5.13. Age of child and place of residence were included as control variables in all models. Three variables remained significant after controlling for all variables, including the control variables. These were, in order of significance: type of prenatal care attendant, father's education, and household possession of radio. No interaction term was found to be significant at the 5 per cent level. All population attributable risk values relative to each variable included in the final model were less than 0.95.

The odds ratios for each category of the variable pertaining to the age of the child were less than one but there appeared to be little difference between the age category 24-35 months and the category 36-47 months. Taking into consideration the t-values, there appeared to be no significant difference between the age category 0-11 months and the category 12-23 months. Urban-rural residence remained significant even after including all variables in the model (odds ratio = 0.55 for rural areas). The odds of having a health record card for children whose mothers were attended by traditional attendants during pregnancy were 0.29 times those of mothers attended by doctors. The odds relative to father's education appeared to be rather weak, since only the education category of secondary or higher seems to have influenced the ownership of health cards (odds ratio = 1.70). There was little difference between the education category 'illiterate with primary education' and the category 'literate with primary education'. The odds of having health cards for children whose households owned a radio were 1.46 times those of households that did not. Two variables, type of prenatal care attendant and ownership of a radio, were predictors of the ownership of child health cards. The type of prenatal care attendant reflected a woman's past experience of health care. The other variable, ownership of radios, seemed most likely to reflect sources of information about health. In Thailand, radio is the only mass medium that can reach all segments of the population in different regions by broadcasting in local dialects as well as the official Thai language. The radio stations are owned by both the public and private

sectors. The public radio broadcasts programs on national development that also deal with health issues, although most private radio stations only broadcast entertainment programs. The results suggest that to some health information is spreading across the region through the radio, which influences women's awareness of health care services.

Table 5.13 : Logistic regression parameters relating explanatory variables to ownership of health record cards of children aged 0-59 months, Northeast Thailand, 1987

Variables	Estimates	SE	t-statistics	Odds ratio	PAR
Age of child		(LRX2 = 30.7, 4 d.f., p < 0.001)			0.65
0-11	0.00	-	-	1.00	
12-23	-0.39	0.26	-1.50	0.68	
24-35	-0.98	0.28	-3.50	0.37	
36-47	-0.87	0.28	-3.11	0.42	
48-59	-1.28	0.29	-4.41	0.28	
Place of residence		(LRX2 = 33.0, 1 d.f., p < 0.001)			0.57
Urban	0.00	-	-	1.00	
Rural	-0.60	0.25	-2.40	0.55	
Type of prenatal care		(LRX2 = 30.9, 2 d.f., p < 0.001)			0.60
Physician	0.00	-	-	1.00	
Nurse/midwife	-0.40	0.20	-2.00	0.67	
Other or none	-1.22	0.29	-4.21	0.29	
Father's education		(LRX2 = 8.8, 2 d.f., p < 0.01)			0.11
Primary and illiterate	0.00	-	-	1.00	
Primary and literate	-0.16	0.22	-0.73	0.85	
Secondary or higher	0.53	0.28	1.86	1.70	
Household possession of radio		(LRX2 = 3.9, 1 d.f., p < 0.05)			0.15
No	0.00	-	-	1.00	
Yes	0.38	0.19	2.00	1.46	

Notes: 1. SE refers to standard error of the estimates.
2. Likelihood Ratio Chi-square (LRX2) and d.f. are reductions in scale deviance and degrees of freedom when a variable added into the model.
3. Age of child and place of residence are control variables.
4. PAR denotes Population Attributable Risk, and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.

Source: Subset of the TDHS data tape, 1987.

In summary, utilisation of preventive health services among mothers in the Northeast of Thailand is significantly influenced by education, family support, access to health services, and previous contact with modern health facilities. Most of these factors showed consistent patterns in relation to utilisation of health services. However, the pattern of the effect of women's education was not clear.

Quantitative analysis alone is unable to explain how education, as well as the other variables, acted upon utilisation of preventive health services. The results seem to suggest some problems in the utilisation of modern health services in the Northeast, particularly the community-based health services. It was impossible to investigate these issues in depth using quantitative data such as that provided by the TDHS. In order to examine these, a qualitative study, which will be described in the following section, was undertaken in Khonkaen province of the Northeast. The results of the case study enabled the utilisation of available health services by women and children in particular, to be examined in depth in order to focus more explicitly on the reasons for the patterns revealed by the quantitative analyses.

5.2 Utilisation of health services: evidence from the case study village

Health centres in the Northeast and elsewhere in Thailand have been established to expand the access of the rural population to modern health care services. The findings discussed in the previous sections, however, indicate that the utilisation of maternal and child health care services was complicated. Despite the availability of health centres situated in most locations, the utilisation by many women was infrequent. Traditional health providers have survived and continued to play a role in providing health care, including maternal and child health services, in rural communities. What remains unclear and needs to be established is how and in what ways the health centre and modern health workers and traditional practitioners are being used in rural villages where the two health systems co-exist. Why do traditional practitioners continue to provide for prenatal and birth care despite considerable evidence that modern health professionals provide services that save the lives of women and children. The data upon which this section has been based were drawn from field research conducted between January and July 1992 in Ban Tha village (pseudonym) in Khonkaen province. All 67 households in the village with children aged under five years (77 children) were recruited for the study. Sixty-seven women or principal childcarers were interviewed, using a replication of the TDHS questionnaire and adding additional questions on feeding patterns,

maternal health behaviour, and treatment and management for sick children (see Appendix A). Qualitative data related to the above aspects, as well as on attitudes towards the various available health services, were also collected. This section will present quantitative and qualitative data on the utilisation of maternal and child health care services in the case study village.

5.2.1 Childbearing practices and beliefs

In general, the proportions of women who made use of the maternal and child health services were high (Table 5.14). Almost all pregnant women (97 per cent) in Ban Tha received ante-natal care from modern trained health personnel. A pregnant woman is supposed to have her pregnancy check-ups and visit the antenatal care clinic according to a fixed schedule during her pregnancy. An initial visit should be made as soon as possible, then followed by a monthly visit until she reaches seven months. A fortnightly visit is recommended during the eighth month of pregnancy, followed by weekly visits in the last month until delivery. Those who cannot keep to the recommended schedule should have visited the antenatal care clinic at least four times during the course of their pregnancies.

For those who received pregnancy check-ups, nearly one-third had visited antenatal clinic less than four times, while approximately 43 per cent of women had made their initial visits only after the first trimester. Almost all women were given some kind of injection during their pregnancies, but only one-third of the women received a tetanus toxoid injection. Ninety per cent delivered their most recent babies in a health institution; almost all of these took place in hospital, the Centre for Health Promotion, Region 6. Only one women gave birth in the village health centre. Although the health centre was located in the village, 10 per cent (eight cases) of births took place at home. Traditional birth attendants were still being consulted in the village, as about five per cent (four women) of the child births which took place in the previous five years were attended by the traditional birth attendants. Nearly one-quarter of children aged under five years had no health record cards.

Table 5.14 : Utilisation of maternal and child health services, Ban Tha, 1992

Type of health service	Percentage	Number
Antenatal care		
Physician	9.1	7
Nurse or midwife	88.3	68
None	2.6	2
Received tetanus toxoid injection		
Yes	58.4	45
Maybe	3.9	3
Don't know	32.5	25
No	5.2	4
Place of delivery		
Hospital	88.3	68
Health centre	1.3	1
Home	10.4	8
Attendant at birth		
Physician	20.8	16
Nurse or midwife	74.0	57
Traditional birth attendant	5.2	4
Ownership of health record cards		
Yes	77.9	60
No	22.1	17
Total	100.0	77

Source: Field research data set, 1992.

To obtain information on tetanus toxoid injections two questions were asked in the field research: 'Did you receive any injection at all during your last pregnancy?' and 'If yes, what kind of injection did you receive?'. In the TDHS only one question was asked: 'When you were pregnant with (name) were you given any injection to prevent the baby from getting tetanus, that is, convulsions after birth?' Nearly one-third of women in the case study village who stated they were given injections did not know what they were for. This may explain why the TDHS reported a relatively high proportion of women who stated that they had received tetanus toxoid injections. In the Northeast where injections were common, respondents may have confused tetanus toxoid injections with other injections received.

Table 5.15 presents child immunisation based on data obtained from health record cards or booklets. Completeness of the selected immunisations was high. Ninety per cent of children under five received BCG vaccine, while the figures for

diphtheria, pertussis, and tetanus (DPT) vaccine and oral polio vaccine (OPV) vaccine were 82 per cent and 73 per cent respectively. Although those who had no health record cards reported having been given vaccines, no information was available on the type of immunisation, age of child, or date given for these children.

Table 5.15 : Children under five who had received selected immunisations, Ban Tha, 1992 (Percentage)

Type of immunisation	Percentage	Number
Anti-tuberculosis (BCG)		
Complete for age	94.9	56
Under age	5.1	3
Complete diphtheria, pertussis, and tetanus (DPT)		
Completely immunised	81.7	49
Complete for age	10.0	6
Incomplete	1.7	1
Never immunised	1.7	1
Under age	5.0	3
Complete three doses of oral polio vaccine (OPV)		
Completely immunised	81.7	49
Complete for age	11.7	7
Never immunised	1.7	1
Under age	5.0	3
Measles vaccine		
Complete for age	73.3	44
No	18.3	11
Under age	8.3	5
Total	100.0	60

Note: Data obtained only from health record cards or booklets.

The health record card or booklet is useful for both the children and the health workers because information on child care and child growth is also recorded in the booklets. Not all children possessed health record cards. Only 33 per cent of under-five children in the Northeast as a whole were able to present their health record cards to interviewers during the TDHS. Possession of a health record card was positively associated with mothers receiving prenatal care, a higher level of father's education, and households having radios. In the case study village nearly one-quarter of children did not have health record cards. Qualitative data collection was able to examine why such a high proportion of children did not have a health

record card. Health record cards were issued to each child at the health centre or other public health institution when a child first attended the well-baby clinic. Local health workers were supposed to update the list of infants in the villages under their jurisdiction and to issue new cards for new-born babies or those who had lost their cards. Some children had no health record cards at all because they had never participated in health activities. Others had been given health record cards but had lost them.

In order to understand how some children came not to have a card, I interviewed the health centre chief and observed health workers performing immunisation and nutrition activities for which the health record cards were needed. The health workers repeatedly told me that mothers' ignorance and lack of knowledge were the major reasons for their children not having health record cards. Most villagers were generally very co-operative and always participated in all health activities, including growth monitoring, immunisation, and nutrition. However, those who did not join were almost always the same group of villagers. These few villagers were described by the health worker as 'ignorant'. They were reported as not concerned about their children's health, they were always busy, and did not have time to look after their children properly; and they were very poor. For example, one four-year-old boy from a three-member family which lived just opposite the health centre always missed out on the health activities. The parents (a 26-year old mother and 30-year old father) earned their living by engaging in construction work in the town. They commuted daily to the town and left their son with relatives. The health workers were never called by the family. Migration from the village was another reason that caused a number of children to miss out on health and nutrition activities. The health workers did not call on those who missed out on the activities. In the past, they had followed up such cases but it still did not improve attendance. They told me that they wanted to establish a system whereby the villagers would want to fully participate and conform to the arranged health activities.

Procedures relating to the issuing of health cards contributed to the low proportion of card holders. No standard health record cards had yet been made available in Thailand, resulting in some confusion among card holders. Mothers who gave birth in an institution other than the local health centre were supposed to be referred to their nearest health centre in rural villages or to the district hospital in town. They were asked to take a pink card recording information about the new-born baby showing place of birth, birthweight and length, birthdate, parents' names and address. The pink card, issued by the public hospitals, was to be used by local health workers to issue a new health record card. However, not all mothers brought the pink cards to the health centres, and some of them had lost them.

I interviewed four of the mothers who had not been able to present their children's health record cards during the survey. Two said that their children had never had health record cards, while the others had lost them. One mother said that when her oldest son had lost his health record card, she had had to pay five *baht* to obtain a new one. The money had not meant much, but she was very embarrassed by the way the health worker treated her in front of other villagers. Such attitudes discouraged villagers from replacing lost cards and from participating in subsequent health prevention activities.

5.2.2 Choice of birth attendant and postpartum practices

Traditionally, childbirth took place at home and was assisted by traditional midwives or *maw tam yae*, together with a woman's mother, relatives and other women who had experienced childbirth. The only advanced preparation was the collection of firewood from the forest by the husband. Other preparations were avoided in order to hide the new-born baby from spirits. The husband prepared a fireplace where the woman should rest after having the baby inside the house. He also helped the women assisting at the delivery by supplying them with instruments and household items when needed. An old cloth or blanket was spread underneath the woman who commonly held on to a rope tied from the ceiling while delivering the baby. Cushions or a mattress were also placed to support her back. The *maw*

tam yae usually sat beside or behind the woman through labour, massaging her back along the hip bones to relieve her pain. She also applied pressure on the upper part of the woman's abdomen to help push the baby out. One woman aged 42 described her experience in delivering her youngest child ten years prior to the interview. She said:

> Giving birth is the most painful experience I ever had, but the pain completely disappeared right after the baby was born. It was ten years ago when I gave birth to my youngest child, I was attended by Mae Pong (the name of the *maw tam yae*). I was leaning on a pile of pillows while she was sitting beside me. When the pain came, I felt as if my hip bone was shattered. She applied pressure right here below my chest. She also gave massage on my buttocks and gave emotional support. I felt relief and it was very good indeed to have her with me. Right after delivery, she bathed my baby and cleaned up all the mess as if she was my relative.

Three *maw tam yae* were identified by the villagers. All had received training from the health workers. Although they were willing to assist births, they advised the women to deliver their babies in the hospitals, delivering only emergency cases.

Villagers reported that institutional childbirth became widespread after a good road network was built three decades prior to the fieldwork, accompanied by the establishment of the village health centre. Hospitals and private clinics in towns provided modern medical services. The availability of such modern health services together with easy access to the towns had brought new concepts of health care to the villagers, who were increasingly exposed to the world outside the village.

All seven older women in a focus group discussion mentioned that they had delivered their babies at home attended by *maw tam yae* because there was no alternative at that time. They agreed that 'today' they would have delivered their babies in hospitals that were well equipped and served by qualified health personnel. One 82 year-old woman mentioned that

> Mother and infant deaths were quite common in the old days, especially during childbirth. Once complications or problems occurred, deaths were almost always the outcome and nobody was able to help them. Unlike now, when qualified doctors and efficient medicines as well as medical instruments are widely available. We do not hear about infant and mother deaths due to delivery now.

Although childbirth was likely to take place in hospital, postpartum practices among the villagers were a mixture of use of modern medicine and traditional practices such as postpartum resting and food restriction. Table 5.16 shows that, although most of the women gave birth in hospital, slightly more than half (56 per cent) practised postpartum resting or *yu kam* and about half (51 per cent) followed food restrictions.

Table 5.16: Women's health behaviour during the antenatal and postnatal period, Ban Tha, 1992

Health behaviour	Percentage	Number
Taken medicine of any kind during pregnancy		
Yes	84	64
No	16	12
Practised food restriction during pregnancy		
Yes	5	4
No	95	73
Traditional postpartum resting (*yu kam*)		
Yes	56	43
No	44	34
Practised postpartum food restriction (*ka lam*)		
Yes	51	39
No	49	38
Total	100	77

Source: Field research data set, 1992.

Postpartum resting (*yu fai* or *yu kam*). Although villagers consulted modern health personnel to assist at childbirth, they did not entirely accept all modern health measures. For example, traditional practices such as *yu kam* and *ka lam kin* (food restrictions) were still maintained. Although most births took place in hospital, the women resumed traditional practices once they returned home. Parents, relatives and neighbours were among the influential groups encouraging women to follow these traditional practices. However, women who underwent female sterilisation after birth refrained from *yu kam* for fear of complications such as infection.

Yu kam was believed to restore and strengthen a woman's muscles and body, prevent back pain and pain in the whole body in old age, stimulate a flow of lochia,

stimulate breast milk production, and prolong birth spacing. The heat used in *yu kam* was thought to dry up the womb before it returned to the pelvis, and conception was considered less likely to occur in a dry womb (*mod luk haeng*) than a wet womb (*mod luk seuan*). Together with *yu kam*, many women also practised post-partum abstinence. The contraceptive role of *yu kam* has become less important since contraceptive devices have become widely accessible. However, the other benefits of *yu kam* are still considered important by the villagers.

Yu kam involved building a place where a woman could lie by the fire. This was usually a small room or an enclosed area in the house where the woman and her baby would be less exposed to the wind. The new-born baby was also put in the same room so that it would be closely watched and receive good care from the mother. The baby was usually wrapped in thick cloth and put on a rice winnowing basket (*kra dong*) on top of a pile of books (representing wisdom) beside the mother but far from the fireplace. At night the husband would sleep close to the area in order to help his wife whenever needed. Water was kept boiling in a tin hanging over the fireplace all day long, and herbs such as tamarind leaves and the bark or wood of a special tree (*fang*) were often added. The water was mainly used for bathing and drinking for both the new mother and her baby. The mothers had to keep their legs together, except when walking, to facilitate the healing of the genital area. The mother had to sit or lie on one or two pieces of timber laid by the fireplace. In the first few days after delivery, she was not allowed to sleep in order to prevent the spirits from taking her soul away. She was encouraged to take frequent hot baths, even at night, to keep her awake. A post-partum woman was expected to take a hot bath as often as she could, at least five times per day. However, to avoid skin problems such as rashes and wrinkles, she was not allowed to rub her skin and body or to wash her hair while taking her bath. Drinking very hot water was also considered necessary. According to the villagers, the quantity of breast milk depended upon the quantity of hot water drunk. Herbal medicines in the form of powder were commonly mixed in the water.

Lying by the fire during postpartum confinement (*yu kam* or *yu fai*)

Some medicinal herbs used during postpartum confinement

Food restrictions (*ka lam kin*) were another traditional practice maintained in the case study village. A postpartum woman completely abstained from ordinary food and almost all kinds of animal products and vegetables, which were believed to cause *kin pid* (eating wrong food) in post-partum women. *Kin pid* was considered to cause severe disorders if it occurred during the post-partum period. Symptoms included severe headache, stomachache, fever, vomiting, diarrhoea, fatigue, cessation of breast milk, and even death. *Kin pid* could be treated by both modern and traditional medicines, but injections were believed to be the most effective treatment. Grilled cooked glutenous rice, salt, grilled garlic or galanga, and roasted chicken or pork were among the few kinds of food commonly eaten by postpartum women. Some women could not tolerate the smell of meat, and therefore refused to take all kinds of meat during *yu kam*. For instance, a 17-year-old mother (who had completed six years of compulsory education) who just given birth to her first son told me that her mother allowed her to eat grilled chicken, but she could not tolerate its smell. Although the villagers felt strongly that food restrictions were important, they paid little attention to *ka lam* while they were in hospital. Many women who delivered in hospital were required to stay for at least two days at the hospital. They reported that they had consumed almost all the kinds of food they were served there. They said that they were not worried about *kin pid* there because they were close to doctors and good medicines, but they did observe the restrictions at home where health workers and medicine were not available. They said that they did not want to risk their lives, so they resumed *ka lam* once they returned home.

Although *yu kam* and post-partum confinement were still performed in the case study village, the procedures had been modified due to the scarcity of firewood and exposure to outside concepts. For example, women tended to have a shorter duration of postpartum confinement (about three to nine days) than in the past. One woman aged 23 years (who had some secondary education) who was working in a textile factory in Bangkok returned home immediately after delivering

her baby. She used a steam-bath or sauna instead of a fireplace during the *yu fai* period. She mentioned that sauna was widely used among her friends in Bangkok, including her employer's wife.

5.2.3 Barriers to utilisation of the local health facilities

Despite the expansion of modern health facilities and knowledge, traditional practitioners continued to be utilised and traditional practices continued to be observed in Ban Tha. Although the utilisation of maternal and child health care services described above was impressive, the health centre and the local health personnel were not used by all and some services were not used as intended. Both modern and traditional health services seemed necessary to the villagers. They tended to consult modern health providers for pregnancy check-ups and childbirth, but maintained their traditional practices during the postpartum period. Traditional practitioners continued to provide support services. Several factors (as reviewed in Chapter One) influenced decisions on which type of health services would be used and when people would use them.

In Ban Tha, the physical accessibility to health care facilities and other health services was quite good. However, some aspects of these services were not entirely accepted by the local population. Although most women made use of modern health care services, the local health facility was not being fully used as intended by the government. For example, the villagers by-passed the local public health facilities to go directly to the higher level health services, both public and private, in towns for general maternal and child health care, including deliveries. Self-medication was also widely practiced, and traditional practitioners continued to be utilised for certain services. Focus group discussions and in-depth interviews revealed several reasons for these features of health services utilisation in the village including the shortage of local health personnel, inconvenience, inefficiency, expense, and psychological factors.

Shortage of the local health personnel. The first question I asked the villagers was 'How many health personnel were posted at the health centre?' The

answers varied: 'three', 'two or three', or 'only two'. There were actually three staff. Two informants did not know exactly how many health personnel worked at the health centre. One had seen only two health workers (the midwife and her husband). He added that the husband was always busy and rarely seen in the health centre, while the midwife was also busy with her children and housework. Only one informant said that she had seen the other female health worker, who had recently transferred to the health centre. She lived in the provincial city and commuted daily to the village on weekdays. As a result she had little opportunity to meet with villagers.

One reason for the under-utilisation of some services by some villagers was poor communication. Various methods were used to communicate with the villagers through the Village Health Communicators (VHCs), loud speakers, during health service consultations, or in informal meetings with the villagers. However, often the message was late; for example, the message was broadcast in the evening if the program was about to begin the following morning. The VHCs, as discussed in Chapter Three, did not function well. Most health activities were implemented with little or no co-operation from the VHVs and VHCs. Although three loud speakers were established in the village (at the temple, *kamnan*, and *phu yai ban* houses), not everybody was allowed to use them for fear of the machine being damaged and due to the cost of maintenance and electricity. The one at the temple was used mostly for entertainment and had to be hired from the abbot. The others were mainly used to broadcast urgent or official messages. Geographically, it was difficult to attract the villagers' attention since the village extended along the road for almost one-and-a-half kilometres.

From the health workers' point of view, excessive workload was one obstacle to improving the health of the villagers. Health workers not only provided curative and preventive health services, but also performed administrative tasks and special health and related programs, such as meetings and participating in the district health office activities. The special health programs in particular required much effort and time, and were relatively new to staff compared to other tasks. Recent changes in the orientation

of the government health programs towards community participation were changing the roles of the local health workers. They became involved in many programs which were initiated at the local level, requiring several meetings with villagers, training of village health workers, and supervising of health volunteers. This interfered with their capacity to provide routine curative and preventive services.

Inconvenience. The health centre was open 24 hours a day and seven days a week, but the office opened only during working hours on workdays. Patients could visit the health workers at home, since their medical kits and essential drugs were kept at home. However, this meant that patients had to wait for service. One informant described how she and her friends visited the health centre late in the morning while the health workers were taking a break at home. They wanted to buy oral contraceptives, which they had to obtain from the health centre every three months. The health workers had asked them to wait for nearly an hour.

Two postpartum mothers who had returned to the village after delivering their babies at the hospital in town did not receive postpartum visits from the midwife. They said that this was because the midwife would not visit the villagers unless she was asked to do so. The villagers added that a service charge for home visits either during the postpartum period or illness had become the common practice. I had an opportunity to observe the health workers while they were visiting new-born babies and mothers in neighbouring villages. The health workers insisted that it was their responsibility to arrange home visits to the women who gave birth at the health centre. They also admitted that all pregnant and postpartum women as well as new-born babies under the jurisdiction of the health centre should be visited. However, it was difficult for them to follow these Ministry of Public Health guide-lines, because they had no way knowing when pregnant women gave birth unless they were directly informed by the villagers. Home visits were not their only responsibility. Medical services and administrative work also took up much of their working time. Although they realised the importance of the preventive aspect of health, demand and expectations for curative care were very high. While not many villagers visited the health centre for preventive care, many did

so when they fell ill. In addition, due to their low salaries, most were also running private clinics at home. This inevitably reduced their capacity (and willingness) to provide services in the health centre.

Efficiency. As noted, most women gave birth in hospital rather than the health centre. All villagers believed that the quality of health personnel, medical instruments and medicines in the hospitals was much better than in the health centre. Births which took place in the hospital were considered safer and more convenient than in the health centre. Personal relationships between the health workers and villagers also influenced the use of the health centre. For instance, a 17-year-old informant who gave birth to her first child said that she was too shy to expose her body to someone she knew, particularly to the midwife. Although she might also feel embarrassed in the hospital, she was less concerned because the health personnel there were complete strangers. Her attitude was reinforced by the midwife's personality; she was rather talkative and insensitive to other people's feelings. Her friends told her that the midwife sometimes made fun of the women whom she assisted. She had also heard about similar incidents from other villagers. As a result, she decided to give birth in hospital (her mother and mother-in-law also encouraged her to do so).

Four young women (aged 17, 19, 20, and 26 years), who had pregnancy check-ups, stated in the in-depth interview that their first pregnancies at the Centre for Health Promotion Region Four (formerly the Maternity Hospital, Region 6), where they planned to deliver their babies. All said their choice of the hospital was influenced by their mothers and mothers-in-law, as well as their neighbours.

Fixed schedule. Some villagers found the fixed schedule for special health activities such as immunisation and growth monitoring inconvenient. The activities were always scheduled in the morning (see Chapter Four, Section 4.3) for the convenience of health workers. These rigid time schedules may have discouraged villagers from participating in preventive health activities, particularly those who were engaged in agricultural work during a high demand season for labour.

5.3 Discussion and conclusion

This chapter has investigated a number of issues concerning the utilisation of maternal and child health services. Several findings were common in all the statistical models of utilisation of health services. Education, particularly women's education, was a significant predictor in all models except for the ownership of health record cards, where husband's education appeared more highly significant. The finding of a strong effect of maternal education on use of maternal and child health services was consistent with findings from studies in various countries (see for example, Parker and Reinke, 1983; Warren et al., 1987; Streatfield et al., 1990; Rutstein et al, 1990; Canovas, 1991; Elo, 1992; and Becker and Peters, 1993). Various possible links between maternal education and use of health services were discussed in Chapter One, Section 1.7. Although Cleland (1989: 411) has agreed that enhancing the mother's modern health knowledge is likely to be the pathway whereby maternal education influences child survival, he also argues that formal content of education, particularly primary schooling, shows little association with changing health knowledge and beliefs of individuals. This is confirmed by the relatively weak relationship between level of education and level of modern health knowledge.

In their study of maternal education and child immunisation in Indonesia, Streatfield et al. (1990) argue that, although maternal education is positively related to knowledge of immunisation (97.7 per cent for those with zero to two years to 100 per cent for those with seven years or more education), there was a high threshold effect for those who received at least some secondary education. However, no clear pattern of practice of immunisation was found in relation to maternal education. The U-shaped patterns were observed regarding completeness of immunisation. They concluded that this reflected two different sets of explanations. The uneducated women were greatly influenced by the local authority, not the content of education per se. As a consequence, they tended to conform to the instructions of authority, whereas, for the highly educated group,

experience in schooling apparently played a significant part in changing knowledge and attitude.

In this study, the inconsistency of the relationship between women's education and the choice of birth practices is in agreement with the Indonesian study; that is, the likelihood of women making use of modern trained health providers for their births was high for both less educated and more educated groups. What emerged from the case studies was that the villagers considered modern childbirth as superior, effective, and accessible. The traditional birth attendants who had recently received formal training, no longer assisted at births. They encouraged the women to visit the hospital instead. The cost of services and transport incurred during institutional childbirths was around 250-500 *baht*. Interestingly, this was not considered a major factor determining utilisation of modern health care services. Studies elsewhere in Thailand also indicate that public hospitals are very popular for childbirth even among the poor urban women in Bangkok (see, for example, Leoprapai et al., 1994: 52).

In respect of father's education, fathers are not traditionally the caregivers in the families but rather the breadwinners, and this creates a puzzle about why this factor is found to be strongly associated with usage of health care services. It seems most likely that father's education acts as an indicator of family resources. Education level is also an important indicator of job opportunity, that is, the higher the education, the better the chance of obtaining a higher paid job. Moreover, in Thailand, whether people engage in public sector work or private enterprise, most are educated and are covered by special health schemes at the work place which also cover other family members. This leads to a greater use of health services among women whose husbands are working.

Family support was assessed here in terms of whether women lived with parents or parents-in-law and this was found to be a significant predictor of prenatal care usage but not of other measures. As demonstrated in the case studies, mothers as well as neighbours had played an important role as consultants to women in

relation to child bearing and rearing practices. The parents may also have acted as an information source to encourage the women if they had a strong vested interest in modern health care. Some mothers accompanied their daughters to have pregnancy check-ups as well as for births in the hospitals. This finding seems to suggest that to effectively improve health-related knowledge, attitudes, and behaviour, health education programs regarding child bearing and rearing should be targeted to wider groups of people in the communities than only the women who do the child bearing and rearing.

Previous health care experience was another set of variables found to be significantly associated with utilisation of preventive health services after controlling for other variables. The findings suggested that those who had had experience of modern health care tended to use it subsequently. Satisfaction of women with the health care provided has not been assessed in this study, but dissatisfaction with modern birth attendants may be one of the reasons for the prevailing use of traditional birth attendants. However, the data show a relatively high number of women who did not use health services. As expected, most of them were disadvantaged in a number of ways, particularly with low education attainment and living far from health resources. It is noteworthy, however, that the coverage of health services in terms of availability was fairly good as measured in the survey. The average distance to the nearest health centre in rural villages in the Northeast region was three kilometres and the corresponding figure for a hospital was 13 kilometres. Nevertheless, the findings indicated that utilisation of health services in rural areas was relatively low. A fairly high proportion of women did not receive prenatal care or appropriate care during delivery. However, evidence from the case study village indicated that women used modern health services due largely to their efficiency, superiority, and accessibility.

Excessive workload and the low quality of the local health care services, however, was a major barrier to use of local health facilities in the study village. These findings supported the results from the few previous studies in Thailand on

the roles and responsibilities of the sub-district health personnel. For example, in his study on tasks performed by the sub-district health workers in Thailand, Deesawat (1990: 4-5) found that the district health workers spent most of their working hours (20-27 per cent) on personal health care such as medical care and immunisation, and work involving the information system, such as taking records and reports, was the second highest time consuming task (14-15 per cent). In terms of an average duration of hours spent on performing designated tasks, Deesawat (1990: 6-7) also found that supervision and training of village health volunteers and communicators required the longest time (an average of 138 minutes) to perform. He concluded that the local health personnel were facing an excessive workload, and that a health centre needed at least three staff members - the average number of health workers posted at a health centre at this time was two staff members - to fulfil the designated tasks (Deesawat, 1990: 16).

Leoprapai and Sirirassamee (1988) assessed the performance of the sub-district health workers from 30 health centres, and found that the time used in performing work varied according to the health personnel's qualifications and skills For example, midwives and professional nurses spent about one-fifth of their working hours on paper work while the comparable figure for the health workers was only one-seventh. The professional nurses and midwives tended to spend most of their time on curative care while the health workers focussed on preventive and promotive health services. Peyaratana (1989: 79-81) argues that the problem regarding roles and functions of the sub-district health personnel stems from conflicts or gaps between the expectations and actual roles and functions. Three factors were believed to have exacerbated the problems: excessive workload, high expectations, and lack of knowledge, skills, and experience. There was an urgent need to educate the health workers to correctly understand their roles as well as to broaden their knowledge. Special attention should be paid to developing curricula that integrated all aspects of health services and knowledge to enable the health

workers to fully exercise their knowledge and skills and to properly manage their work.

The villagers made use of the health centre for certain purposes. Pregnancy check-ups, contraception, and immunisation were among the maternal and child health preventive services for which the health centre was being used. However, the villagers were less likely to visit the health centre for childbirth practices and child treatment. In other word, proximity to public health services, particularly the health centre, did not make the villagers use them, so long as there were structural barriers. Traditional practices were also maintained during the postpartum period. The villagers moved freely between traditional and modern health services as well as public and private health resources. Particularly in the case of curative services, the superiority of modern health services in terms of effectiveness and accessibility has influenced the villagers to make use of both public and private modern health care. The villagers viewed the modern and traditional health systems as equally important and as complementing each other in the healing process. Curative health care services have long been provided, while preventive services have recently been promoted in Thailand as witnessed from the substantial increase in numbers of health facilities and providers. The results seem to suggest that the quality of health care, particularly that of the local health resources, urgently needs improvement to match the satisfactory increase in the number of local health facilities.

The previous two chapters have been dealt with health services and their utilisation using the TDHS and field research data. The general discussion has now been concluded and the following chapters are focusing on nutritional status and diarrhoeal morbidity.

CHAPTER SIX

Patterns of nutritional status and health of children and women: data from the TDHS

This chapter describes the nutritional status and health of the study population for both the country as a whole and the Northeast region. The data on reported age and anthropometric measurements of children are analysed first in order to provide a broad picture of the quality of these two crucial sets of data. Section 6.2 presents the health profile of children under five for the country as a whole, as well as for the Northeast. Two major health aspects are discussed: the nutritional status of children aged 3-36 months and the prevalence of diarrhoea in children aged 0-59 months. Section 6.3 discusses the maternal anthropometry of ever-married women aged 15-49.

6.1 Quality of data on reported age and anthropometric measures

Anthropometric measurements of children aged 3-36 months were one of the main components of data collected in the TDHS. Measurement was carried out by trained research teams (Chayovan et al., 1988: 111). Anthropometric measurements must be interpreted according to the age of child. Thus, age misstatement together with measurement errors of weight and height, can introduce serious errors into the analysis of these nutritional indicators. The quality of these two crucial sets of data on age, and weight and height are discussed below.

There were 3,652 children aged 0 to 59 months identified from the national sample, of whom a total of 2,003 were aged 3-36 months. Of these, 1,831 (or 1,857 for the weighted number) were measured for weight and height and had complete age reported and so could be included in this analysis. In the Northeast region covered by the present study, 735 children aged 0-59 months were identified. Of these, 388 met the criteria and hence were eligible for assessment of nutritional status.

6.1.1 Data on age of children

The data on the age of children were obtained by asking respondents to state the birth dates of their children and, if possible, to present documentary evidence of age. Date of birth was converted into completed months of age. If the birth dates were incomplete, for example either month or year of birth were not stated, interviewers asked the respondents to state the age of the children in months, which is considered a common practice in Thailand. Chayovan et al. (1988: 111) noted that documents were produced for slightly more than half of the children born during the five years preceding the survey. Table 6.1 reports the completeness of information on the reported age of living children aged under five in the Northeast region and for the country as a whole. The date of birth was reported for almost all children. Information was reported on both month and year of birth for about 98 per cent and 97 per cent of children at the regional and national levels respectively. Either month or year of birth was not stated for less than two per cent of children. In those cases, the ages of the children were as reported by the respondents. If the completeness of information is taken to indicate accuracy of age reporting, the quality of the data on age from the TDHS is relatively high.

Table 6.1 : Completeness of information on reported age of children under five, Thailand ,1987 (Percentage)

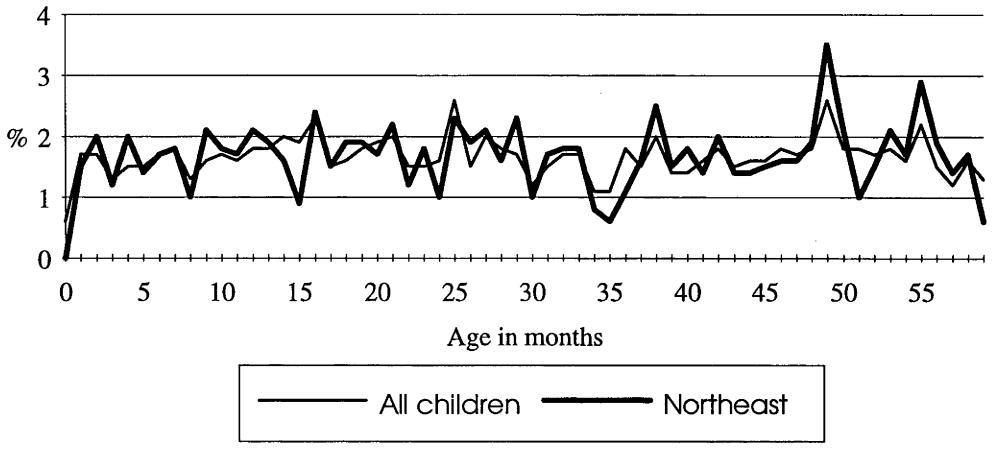
Completeness	Northeast region		Whole country	
	Unweighted	Weighted	Unweighted	Weighted
Month and year reported	98.2	98.4	97.4	97.3
Year and age reported (month imputed)	0.1	0.2	1.1	0.8
Year reported (month and age imputed)	1.2	1.0	0.5	0.5
Age reported (month and year imputed)	0.0	0.0	0.0	0.0
No information	0.4	0.4	1.0	1.3
Total number of children	100 (735)	100 (1290)	100 (3627)	100 (3652)

Notes: 1. Percentages may not add to 100 due to rounding.
2. Figures in parentheses are numbers of children.

Source: Subset of TDHS 1987 data tape (retry.sps).

Figure 6.1 illustrates the percentage distribution of age reported for children under five years of age, comparing the Northeast with the overall distribution. There was no clear pattern of age heaping except for possibly unusually high concentrations of children's ages around 24, 38, 49, and 55 months. In most cases where ages of children are not reported accurately, high concentrations are reported at age 12, 18, 24, 30, and 36 months. This is not the case for the TDHS age data.

Figure 6.1 : Reported age of children under five, Thailand, 1987



Source: Subset of TDHS 1987 data tape (retry.sps).

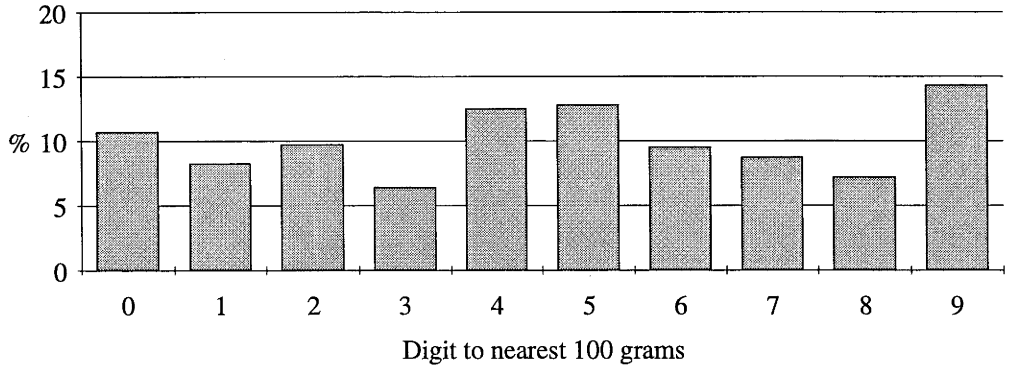
6.1.2 Data on anthropometric measurements

The collection of data on child anthropometry has become increasingly commonplace in surveys in developing countries. This type of data, especially data on weight and height, can be obtained easily and can be used to indicate the general health of the population. However, errors in the anthropometric measurements have an adverse effect on the derived indicators of nutritional status which are normally used to indicate the health status of the population, namely weight-for-age, height-for-age, and weight-for-height (Pelletier, 1991: 1073). In investigating the quality of child anthropometric measurements (weight and height) in this study, data on the identity of the individuals taking the measurements were not available. Only the overall distribution of the data and digit preference were examined.

As with age data, preference for reading and recording certain digits may be marked in anthropometry measures. Possible bias in the anthropometric data was also investigated by examining the percentage distribution of children's weight and height by the terminal digit (0 to 9). Statistically, each digit should have approximately the same chance (that is, a 10 per cent chance) of occurring in the distribution. The greater the heaping on certain digits, the lower the confidence in the quality of the data. The data were aggregated separately according to the terminal digit for weight and height (or body length) for children aged 3-36 months, for whom anthropometric data were available.

Figure 6.2 depicts the relative concentration of the weight measurements of children on each terminal digit (to the nearest 100 grams). There was evidence of possible heaping at the terminal digits 4, 5, and 9. The data also show noticeable troughs at terminal digits 1, 3, 7, and 8.

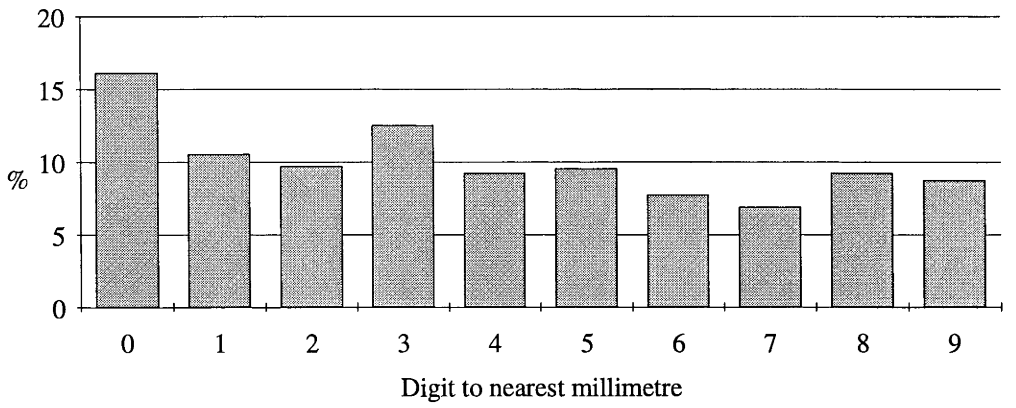
Figure 6.2 : Relative concentration of weight measurements of children aged 3-36 months by terminal digit, Northeast Thailand, 1987



Source: Subset of TDHS 1987 data tape (retry.sps).

The relative concentration of height (to the nearest 1 millimetre) is shown in Figure 6.3. In general, height or body length measurements seem rather inaccurate because of the marked heaping at terminal digit 0, and the depressions at terminal digits 6 and 7.

Figure 6.3 : Relative concentration of children's height or body length measurements by terminal digit, Northeast Thailand, 1987



Source: Subset of TDHS 1987 data tape (retry.sps).

Possible reporting bias was also examined according to the age group of the children, as shown in Figure 6.4 and Figure 6.5. There was little variation in digit preference for weight except for three digits: a significant depression on terminal digit 1 (for age groups 12-23 and 24-36 months) and 3 (for all age groups), and a very high concentration on the terminal digit 5 for children aged 24-36 months. The preference for terminal digit 0 for height was also very high for children aged 12-23 months. A possible reason for this age specificity may be that it is difficult to keep children aged 12-23 months still long enough to measure length accurately.

Figure 6.4 : Relative concentration of weight measurements by terminal digits and age of child, Northeast Thailand, 1987

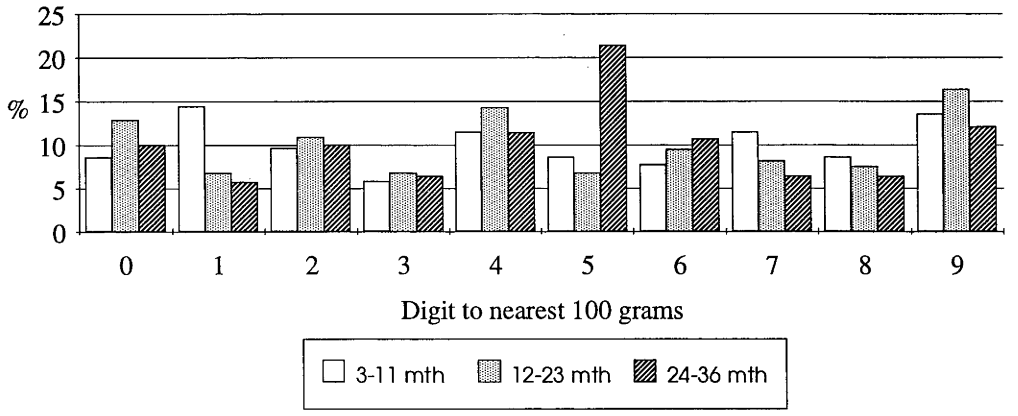
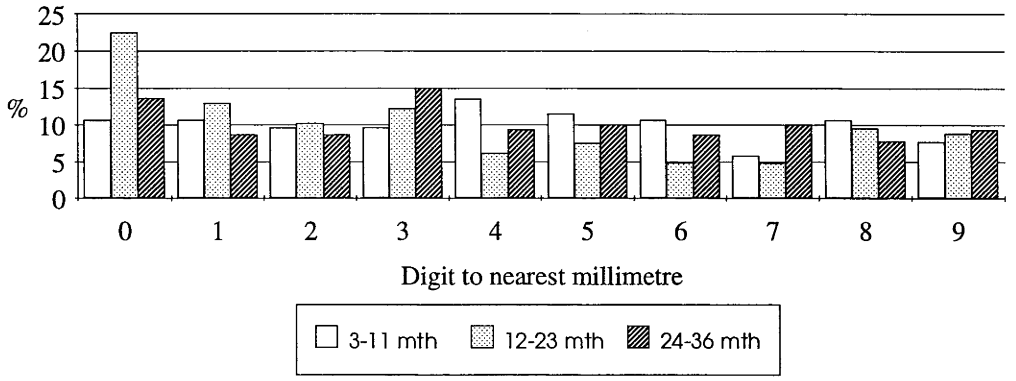


Figure 6.5 : Relative concentration of height or length measurements by terminal digit and age of child, Northeast Thailand, 1987



Source: Figures 6.4 and 6.5 from subset of TDHS 1987 data tape (retry.sps).

Despite the evidence of bias due to possible digit preference discussed above, the TDHS data on weight and height of children can be considered of reasonably good quality for the assessment of nutritional status in population sub-groups. Because the present study examines the impact of explanatory variables using logistic regression, any bias will not result in bias in the estimated regression coefficients (Pelletier, 1991: 1076).

6.2 Nutritional status of the underfives

The discussion in this section seeks to determine the pertinent features of the health of the children under five. The health status of children was examined in terms of two different measures: nutritional status as measured by anthropometry and morbidity of diarrhoea. The analyses were performed separately for each measure based upon the availability of data; that is, the analyses of nutritional status were confined to children aged 3-36 months, whereas all children under five years of age were included in the analyses of diarrhoea morbidity. This attempts to compare the patterns of anthropometric status and diarrhoeal morbidity between the Northeast and that of the national level.

6.2.1 Nutritional status of children aged 3-36 months

The TDHS data is cross-sectional. At best, it allows the retrospective assessment of the nutritional status of children in terms of differences in the mean values for growth measures and differences in the prevalence of some degree of growth retardation as a classification of malnutrition. An assessment of change over time or in the velocity of growth is impossible. This sub-section begins with the comparison of mean weight and height of the children between Bangkok and the Northeast. The children from Bangkok were chosen for the purpose that they would be healthier due to better living and environmental conditions for good growth and health status.

Differences in weight. The average weight in kilograms among different age groups was compared for both boys and girls for the Northeast region and Bangkok and is shown in Table 6.2. Children from the capital city of Bangkok were heavier than those from the Northeast for all age groups. The pattern was consistent for the weight of boys in Bangkok and the Northeast. The gap was relatively narrow for children under 18 months, for whom the differences were half a kilogram or less. The biggest differences for mean weight of boys were at age 30-36 months, an average difference of 12.6 kilograms for Bangkok and 11.3 kilograms for the Northeast.

A similar situation was found for girls; those from Bangkok were heavier in almost all age groups, except for the youngest ages, 3-5 months, where the Northeast girls were 0.2 grams on average heavier than those from Bangkok. Beyond the age of 6 months, Bangkok girls had higher mean weights than those in the Northeast, and the differences increased with age. For Bangkok girls, the mean weight increased from 5.9 kilograms at age 3-6 months to 12.4 kilograms at age 30-36 months, whereas the mean weights for Northeastern girls increased from 6.2 to 11.2 kilograms for the same age groups. The largest difference in the average weight of 1.7 kilograms, was found at ages 24-29 months. The differences in mean

weight of boys between Northeast and Bangkok were statistically significant ($p < 0.001$).

Table 6.2 : Mean weight and differences in mean weight of children aged 3-36 months by sex and region, Thailand, 1987

Age in months	Boys** NE (kg)	Boys** Bangkok (kg)	Difference in mean weight (kg)	Girls** NE (kg)	Girls** Bangkok (kg)	Difference in mean weight (kg)
3-6	6.9	7.1	-0.2	6.1	5.9	0.2
6-11	7.7	8.2	-0.5	7.2	8.0	-0.8
12-17	8.9	9.5	-0.6	8.4	9.1	-0.7
18-23	9.7	10.8	-1.1	9.3	10.3	-1.0
24-29	11.0	11.8	-0.8	9.9	11.6	-1.7
30-36	11.3	12.6	-1.3	11.2	12.4	-1.2

Notes: 1. Using weighted number of children.
2. ** statistically significant ($p < 0.001$).
3. NE refers to the Northeast region.

Source: Subset of TDHS 1987 data tape (nutnew.sps).

Differences in height. The height and differences in height of children aged 3-36 months in Bangkok and the Northeast were compared and the results are given in Table 6.3. A similar pattern of regional differences was observed. The Bangkok boys were taller than those of the Northeast, and the differences in mean heights widened with age. In the Northeast, mean heights increased from 62.5 centimetres at age 3-5 months to 87.2 centimetres at age 30-36 months, while the corresponding figures for the Bangkok boys were 63.8 centimetres at age 3-5 months increasing to 90.7 centimetres at ages 30-36 months. The largest difference was 3.5 centimetres at age 30-36 months.

Differences in the mean height of girls were similar to the differences in weight. The Northeasterners at age 3-6 months averaged one centimetre taller than their Bangkok counterparts. Beyond the age of 3-6 months, the mean heights of Northeastern girls lagged behind those of Bangkok girls. The gaps increased with age. The largest difference was found among girls aged 24-29 months, a difference

of 5.6 centimetres. In general, the differences in mean height tended to increase with age and the differences were significant ($p < 0.01$).

Table 6.3 : Mean height and differences in mean height of children aged 3-36 months by sex and region, Thailand, 1987

Age Difference in months	Boys*		Difference	Girls*		
	NE (cm)	Bangkok (cm)	in mean height (cm)	NE (cm)	Bangkok (cm)	in mean height (cm)
3-5	62.5	63.8	-0.3	60.3	60.5	-0.2
6-11	68.5	69.6	-1.1	67.2	69.7	-2.5
12-17	74.9	77.0	-2.1	73.8	75.1	-1.3
18-23	79.2	82.0	-2.8	78.1	81.8	-3.7
24-29	83.5	86.6	-3.1	81.6	87.2	-5.6
30-36	87.2	90.7	-3.5	86.9	90.6	-3.7

Note: 1. * Statistically significant ($p < 0.01$).
2. NE refers to the Northeast region.
Source: Subset of TDHS 1987 data tape (nutnew.sps).

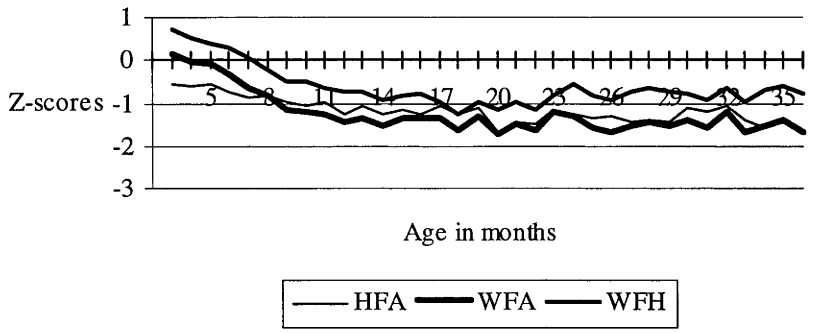
These findings suggest that the potential growth of Thai children during their early months of life is comparable regardless of region. The apparent higher mean weight and height values of the Northeast children compared with the Bangkok children at ages 3-6 months may be due to measurement bias which will be discussed later in this sub-section. The Northeast children were not born shorter or lighter than those who were born in the capital city, but a gap emerged as they grew older. It is not surprising that the gain in height and weight was more satisfactory for children in Bangkok, where economic and social conditions are more favourable. The Northeast region, by contrast, lags behind Bangkok in terms of many aspects of development, including economic, social and health aspects as discussed in Chapters Two and Three.

Growth patterns. The nutritional status of children aged 3-36 months was determined using the National Centre for Health Statistics (NCHS) sex-specific reference standards. The patterns for the country as a whole will be presented first followed by the Northeast. The indices used were height-for-age (HFA), weight-

for-age (WFA), and weight-for-height (WFH). As discussed in Chapter Two, Section 2.4 that these measurements indicate the extent of both long-term or chronic under-nutrition and short term or acute under-nutrition in a population. Chronic under-nutrition results in retarded growth in stature, or stunting. The interpretation of underweight-for-age, however, is still a matter of debate because the indicator cannot distinguish whether malnutrition is acute or chronic. Data on weight is relatively easy to obtain and such data are being routinely recorded by most health and nutrition surveillance programs. These data can be used to assess health status, although controversy remains. In this study, despite the number of children who were classified as low weight-for-height or wasted is relatively small (five per cent), the low weight-for-height index will be further analysed.

The overall mean z-score values of height-for-age, weight-for-age, and weight-for-height, which represent the distance from the reference median standard deviation, are shown in Figure 6.6. There was a downward trend in mean z-scores of height-for-age from a level of -0.5 standard deviation units at three months to a z-score below -1.5 SD at age 20 months. The data also show clear evidence that Thai children were short for age in their first few months of life. At age 3-5 months, Thai children were about half a standard deviation below the international reference mean. Results from previous studies on nutritional status of preschool children (see for instance Smith and Hauck, 1961: 55) have stated that gain in height and weight for Thai children was satisfactory for the first six months of life compared with the international standard population. The rates then drop and do not again approach the reference standard throughout the preschool years.

Figure 6.6 : Mean z-scores of nutritional indices of children aged 3-36 months, Thailand, 1987



Source: Subset of TDHS 1987 data tape (nunat.sps).

Chayovan et al. (1988: 114) have commented that the disparity in z-scores for height-for-age during the early months of life is possibly due to under-reporting of height measurements, particularly for young children. The TDHS data on the length of young children aged under two years were obtained from measurement of recumbent length, which requires the measurers to press the children's knees firmly in order to get an accurate measure. This is extremely difficult to do, particularly with very young children. This may have led to bias in reading and reporting the length of children. When compared to the international reference population, the standard deviation distribution of the observed population was lower. While children under six months of age were excluded from the analyses of nutritional status presented in Chapter Seven, it should nevertheless be noted that the overall trend in Figure 6.6 is plausible.

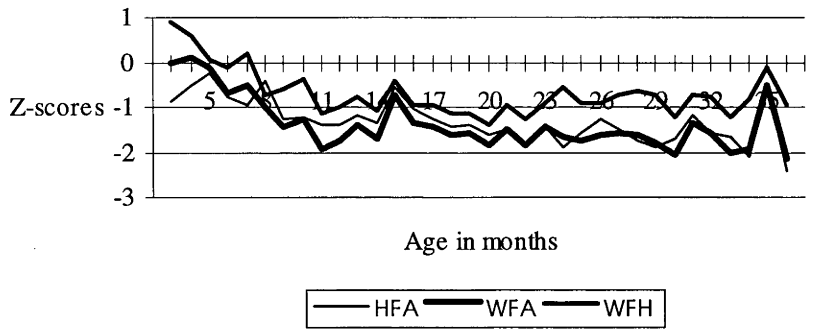
The distribution of the weight-for-age data followed a similar pattern to the height-for-age data. Z-score values declined from a level equal to the reference population at three months of age to a relatively low value of below -1 SD at 12 months. A downward trend of mean standard deviation was observed at older ages, reaching -1.5 SD at age 18-20 months. From the age of 20 months onwards, the difference was roughly constant. Young children aged 3-5 months did well, with a mean weight-for-age close to that of the WHO-NCHS reference population.

The values of mean weight-for-height for Thai children were above the reference mean for the age groups below six months. However, this could be a function of lower recorded height. There was a marked reduction at age 7 months, reaching -1.5 SD at 18 months. The downward trend seemed to be constant until age 22 months; although the mean z-scores tended to increase thereafter, they still fell below the reference population. These results are consistent with those from studies conducted in most developing countries. Young children are at great risk of infection and malnutrition, which is reflected in more children being wasted. The result of cumulative effects of episodes of infection and malnutrition over time is stunting. Therefore, older children tend to be more stunted due to their longer exposure to infections and malnutrition.

In the Northeast, a similar downward trend was observed for nutritional indices among children (Figure 6.7). In general, all indices show a similar pattern. At early ages (less than eight months) children tended to have more favourable nutritional status except for the height-for-age index. After the age of 8 months, the nutritional status of children generally deteriorated until the age of 15 months. Growth was fairly stable thereafter. There is an unexplained rise in mean nutritional status at around the age of 35 months.

Although the expected height of very young children was noticeably lower than the reference standard, they seemed to catch up with the norm in terms of height-for-age at around age five months. Thereafter, there was evidence of growth deficits until the age of eight months, when there was some improvement. After a further decline, the z-score seemed to stabilise at around 14 months. Another turning point was observed at 15 months. Beyond 15 months, children experienced further growth deficits and a further decline was noticeable. The situation among those aged 36 months was the worst. There were no sex differences but rural age-specific levels for all nutritional indices were lower than those for urban children (the data were not presented here but discussed in Chapter Seven).

Figure 6.7 : Mean z-scores of nutritional indices of children aged 3-36 months, Northeast Thailand, 1987



Source: Subset of TDHS 1987 data tape (nutnewne.sps).

In summary, the growth pattern of the Northeast children revealed a similar figure as the rest of the Thai children. The anthropometric status was comparable to the WHO-NCHS reference at the early age, five months or younger, a considerably dropped in the mean standard deviations of weight-for-age and height-for-age were observed thereafter. This growth pattern corresponds to that of children in most developing countries, for instance Malaysia (Thomson, 1961: 160), Guatemala (Mata, 1978: 170-172), and India (Swaminathan et al., 1964: 255). It is widely accepted that the uniform growth retardation of young children especially after the first six months of life, is due primarily to the synergistic interactions of nutrition and infection (Gordon et al., 1963; Scrimshaw et al., 1968; Mata et al., 1983; Tomkins and Watson, 1989). If infants are breast-fed, the immune properties of breast milk provide protection for several months. However, the mechanism begins to fade when supplemental foods are introduced (Mata, 1978: 233). In some societies where weaning takes place prematurely shortly after birth, growth faltering occurs at an earlier age (Mata, 1978: 179; Jellife and Jellife, 1978a). Supplemental foods may not be prepared hygienically, not stored in a healthy environment or not fed hygienically. Therefore, a striking feature during weaning is the recurrence of infectious disease (Mata, 1978: 233); diarrhoeal disease is the most prevalent (Gordon et al., 1963).

Patterns of undernutrition

This subsection examines the extent of undernutrition using the above nutrition indices. A distinction between normal nutrition and undernutrition was made for those who had achieved the expected height and weight for their age and those with low weight- and height-for-age. The cut-off point of -2 standard deviation units below the median of the reference population was used to separate well nourished from malnourished children. Apart from the three indicators of nutritional status discussed above, the Waterlow classification will also be examined. The Waterlow classification, by contrast, uses height-for-age in conjunction with weight-for-height, to classify protein-energy malnutrition (PEM) according to severity, and also to gain some idea of its duration (Seonane and Latham, 1971: 98; Waterlow, 1972: 566). The classification permits a distinction to be made between the chronic and acute components of under-nutrition which is useful for future planning and policy making. This classification establishes categories of wasting, stunting, and concurrent wasting and stunting, based on comparisons and cross-tabulations of individual children's weight-for-height and height-for-age values with selected cut-off values from the reference population (Waterlow and Rutishauser, 1974: 13). The cut-off values of less than -2.0 for weight-for-height (about 80 per cent of the reference population median) and for height-for-age (about 90 per cent of the reference population median) are applied in this analysis.

Low height-for-age or stunting. Table 6.4 presents the distribution of standardised height-for-age for children aged 3-36 months for various categories by sex and age for the country as a whole. By and large, the distribution is skewed markedly to the left. Eighteen and four per cent of children fell between -2.00 to -2.99 and -3.00 or below standard deviation units respectively, whereas only one per cent of children were found to be taller than expected for their age. The proportion of boys in the various categories of height-for-age did not differ significantly from that of girls, although a slightly higher proportion of girls were severely stunted (five per cent compared with four per cent for boys). The children's height-for-age increased with age. None of the children aged five months or younger were severely

stunted (-3 SD or below) while the proportion of stunted children increased with age thereafter. The variation in moderate stunting (-2.00 to -2.99 SD) follows a similar pattern. The variation in child nutrition was observed across all regions. The percentage of stunted children was lowest in Bangkok (10 per cent) and, as expected, highest in the Northeast (27 per cent).

Table 6.4 : Children aged 3-36 months by z-score category of height-for-age from the mean standard deviation of the WHO-NCHS reference by selected characteristics, Thailand, 1987 (Percentage)

Characteristics	Standard deviation units						Weighted no. of children
	-3.00 or less	-2.00 to -2.99	-1.00 to -1.99	-0.99 to +0.99	+1.00 to +1.99	+2.00 to high	
Sex of child							
Boy	4	19	38	38	2	0	943
Girl	5	17	34	40	3	1	913
Age of child in months							
3-5	0	5	28	61	4	1	138
6-11	2	12	34	48	4	0	328
12-17	3	17	39	38	3	1	370
18-23	5	23	37	33	2	1	340
24-29	8	20	40	30	2	0	359
30-36	6	24	33	37	0	1	322
Region							
Northeast	5	22	40	32	2	0	672
North	6	17	44	33	1	0	353
Central	3	15	28	51	3	1	346
South	6	19	36	36	2	1	295
Bangkok	2	8	25	58	6	2	191
Overall sample	4	18	36	39	2	1	1857

Source: Subset of TDHS 1987 data tape (nutnew.sps).

Low weight-for-age or underweight

The low weight-for-age or underweight is presented in Table 6.5. Again, the distribution was markedly skewed compared with that of the WHO-NCHS reference population. Low weight-for-age (below -2 SD) accounted for 26 per cent for the overall sample. There was very little difference between boys and girls: 27 per cent of girls and 26 per cent of boys respectively were considered to be underweight.

Marked variation in the proportion of children underweight for age was observed by age: older children were worse off than younger children (3-5 months). The largest proportion of children (eight per cent) with extremely low weight-for-age (-3 SD or less) was among those aged 24-29 months. The Northeast figures showed the lowest levels of nutrition, with 34 per cent of children underweight (about three times higher than the percentage in Bangkok).

Table 6.5 : Children aged 3-36 months by z-score category of weight-for-age from mean standard deviation of the WHO-NCHS reference by selected characteristics, Thailand, 1987 (Percentage)

Characteristics	Standard deviation units						Weighted
	-3.00 or less	-2.00 to -2.99	-1.00 to -1.99	-0.99 to +0.99	+1.00 to +1.99	+2.00 to high	no. of children
Sex of child							
Boy	5	21	40	32	3	0	943
Girl	4	22	34	37	2	1	913
Age of child in months							
3-5	0	1	8	79	11	2	138
6-11	1	18	31	46	5	0	328
12-17	4	24	39	30	1	1	370
18-23	6	25	43	25	1	1	340
24-29	8	22	44	25	1	0	359
30-36	4	27	41	28	1	0	322
Region							
Northeast	6	28	37	27	2	0	672
North	4	22	41	32	1	0	353
Central	4	17	36	40	3	1	346
South	3	18	36	40	2	1	295
Bangkok	1	11	35	46	5	1	191
Overall sample	4	22	37	34	2	0	1857

Source: Subset of TDHS 1987 data tape (nutnew.sps).

Low weight-for-height or wasting. Table 6.6 shows that girls were not at a relative disadvantage in nutrition in Thailand. Levels of acute malnutrition or wasting were almost equal for both sexes, six per cent for boys and five per cent for girls. The 18-23 month age group had the highest prevalence of acute under-nutrition with a rate of 15 per cent. Children under one year of age had less

malnutrition than older children. There was little difference in the proportion of malnourished of the various categories of malnutrition across the regions, possibly because very few children were classified as wasted.

Table 6.6 : Children aged 3-36 months by z-score category of weight-for-height from mean standard deviation of the WHO-NCHS reference by selected characteristics, Thailand, 1987 (Percentage)

Characteristics	Standard deviation units						Weighted no. of children
	-3.00 or less	-2.00 to -2.99	-1.00 to -1.99	-0.99 to +0.99	+1.00 to +1.99	+2.00 to high	
Sex of child							
Boy	0.2	5.4	34.1	55.0	4.2	1.0	943
Girl	0.6	4.6	32.5	56.7	4.2	1.4	913
Age of child in months							
3-5	0.0	0.8	6.4	61.3	25.0	6.6	138
6-11	0.0	1.4	22.5	67.2	6.3	2.6	328
12-17	0.9	5.5	41.8	48.8	2.4	0.7	370
18-23	0.9	14.0	38.9	43.9	1.8	0.6	340
24-29	0.0	1.3	39.0	58.2	1.4	0.1	359
30-36	0.4	4.7	34.1	60.0	0.7	0.1	322
Region							
Northeast	0.3	5.4	39.5	50.4	3.2	1.2	672
North	0.8	5.2	30.4	58.0	3.8	1.8	353
Central	0.4	4.0	35.5	55.4	4.5	0.2	346
South	0.2	5.2	23.5	64.1	5.8	1.2	295
Bangkok	0.3	4.9	28.3	59.0	5.4	2.0	191
Overall sample	0.4	5.0	33.3	55.8	4.2	1.2	1857

Note: Percentages may not add to 100 due to rounding.

Source: Subset of TDHS 1987 data tape.

Waterlow classification. Table 6.7 presents the prevalence of malnutrition classified by combining the indices for height-for-age and weight-for-height as discussed above. Four broad categories of nutritional status are distinguished: 'normal nutrition' includes children whose weight-for-height and height-for-age was above -2 SD; 'stunting only' includes those whose height-for-age was below -2 SD but who were normal in terms of weight-for-height; 'wasting only' represents children who had a weight deficit relative to height (below -2 SD) but who achieved normal height-for-age; while 'wasting and stunting' refers to those for whom both weight-for-height and height-for-age were below -2 SD. For the overall sample, 20

per cent of children were previously malnourished or stunted, four per cent were currently or acutely malnourished, and two per cent were severely malnourished (wasted and stunted).

Table 6.7 : Children classified as undernourished according to the Waterlow Classification (weight-for-height by height-for-age) by selected background characteristics, Thailand, 1987 (Percentage)

Variables	Percentage of children stunted	wasted	stunted &wasted	No. of children
Sex of child				
Boy	20	3	3	943
Girl	21	4	1	913
Age of child in months				
3-5	5	1	0	138
6-11	14	1	0	328
12-17	19	6	1	370
18-23	21	8	7	340
24-29	28	1	0	359
30-36	27	3	3	322
Place of residence				
Urban	10	4	1	308
Rural	22	4	2	1548
Region				
Northeast	24	3	3	672
North	22	5	1	353
Central	17	3	1	346
South	22	3	3	295
Bangkok	9	5	1	191
Overall sample	20	4	2	1857

Notes: 1. 'Wasted' represents children whose z-scores of weight-for-age fall below -2 SD and z-scores of height-for-age above -2 SD.
2. 'Stunted' represents children whose z-scores of weight-for-age fall above -2 SD and z-scores of height-for-age fall below -2 SD
3. 'Stunted and wasted' represents children whose weight-for-age and height-for-age standard deviation units fall below -2 SD.
4. Sums of percentages may slightly differ from 100 due to rounding.

Source: Subset of TDHS 1987 data tape (nutnewne.sps).

The cross-sectional classification of malnutrition shows that a slightly higher proportion of girls than boys were acutely or chronically malnourished. However, fewer girls suffered from severe malnutrition in terms of the Waterlow index (wasted and stunted). The age distribution of malnutrition by this measure was consistent with the previous discussion of the nutritional status measures of HFA and WFH.

That is, the prevalence of stunting increased with age, while acute malnutrition (wasting) was found mainly among children aged one to two years and the rates levelled off at older ages. Although the patterns of severe malnutrition (both wasting and stunting) were inconsistent, as for the pattern of wasting young children, particularly those less than one year old, were better off. The prevalence of severe malnutrition increased sharply after age one. It reached a peak of seven per cent for ages 18-23 months, after which it again dropped.

More rural than urban children were stunted only or both wasted and stunted. Twenty-two per cent of rural children were stunted while the corresponding figure for urban children was less than half of this (10 per cent). The prevalence of severe malnutrition (both stunting and wasting) in rural areas was slightly more than twice the proportion of malnourished in urban children. However, for acute malnutrition (wasting only) no difference was found between urban and rural children.

In the Northeast, 26 per cent of children aged 3-36 months had low HFA or were stunted (Table 6.8). A slight difference in the prevalence of stunting was observed between boys and girls; that is, girls were about five per cent more likely to be stunted than boys. Older children had lower HFA. Significant differences in HFA were found for younger children (under 18 months) and older children (18 months or older). The proportion of stunted children was about twice as high among older children and as much as three times higher among those aged 30-36 months.

The prevalence of low weight-for-age in children aged 3-36 months was greater than the prevalence of low HFA; 32 per cent of children were underweight. Once again, girls had a higher prevalence of under-weight than boys. Growth retardation as measured by weight-for-age was rarely found in children aged 3-6 months: only five per cent were classified as under-nourished. After the first six months of life, the prevalence of low WFA increased markedly. The level rose nearly eight times for children aged 7-11 months and continued to increase with age,

the highest prevalence occurring in the oldest age group (30-36 months) with a rate of 44 per cent.

Table 6.8: Undernutrition among children aged 3-36 months by anthropometric indices (stunted, underweight, and wasted) and sex, Northeast Thailand, 1987

Characteristics	Percentage undernourished			No. of children
	Stunted	Underweight	Wasted	
Sex of child				
Boy	23	30	6	191
Girl	28	33	4	197
Age of child				
3-5	7	3	2	30
6-11	19	28	1	72
12-17	16	32	4	75
18-23	32	31	13	72
24-29	33	37	1	78
30-36	36	44	7	61
Overall sample	26	32	5	388

Notes: 1. Z-score values of -2 SD unit or below the international reference median are considered as under-nourished.
2. Sums of percentages may differ slightly from 100 due to rounding.

Source: Subset of TDHS 1987 data tape (nutnewne.sps).

The pattern of weight-for-height was different. Only five per cent of children were classified as acutely undernourished with low weight-for-height or wasting. The level of acute malnutrition was appreciably higher for boys than girls. The age distribution of acute malnutrition among children in the Northeast did not differ from the national age distribution.

However, in the Northeast, growth retardation began at a very young age. For example, at ages 3-6 months 12 per cent of children were already stunted, five per cent were underweight, and two per cent were wasted. Although there was evidence of measurement bias as discussed earlier, to some degree malnutrition remains a more serious unsolved health problem in the Northeast than in the country as a whole. This age pattern of growth retardation may be explained in part through the effects of maternal anthropometry and infectious diseases. The relatively high prevalence of chronic malnutrition, as signified by low height-for-age or stunting in

young children, may reflect the consequence of factors originating at birth. Those children may have been born small for gestational age or with low birthweight. Studies in Thailand on birthweight, although mostly based on hospital records, indicate that low birthweight is common (Chaturachinda et al., 1979: 185; Perera and Lwin: 1984: 15; Nondasuta et al., 1986a: 197-199; UNICEF, 1988: 66). In some areas with marked seasonal variations, the time of the year of the birth is more important in determining later status than birthweight (Prentice et al., 1987).

Another factor leading to chronic malnutrition is infectious disease, which is likely to occur in the most susceptible age groups, and have a negative impact on children's health and nutritional status. Schelp et al. (1990: 122-123) conducted a longitudinal study of children's health during the period between July 1982 and June 1985 in four villages in Khonkaen province in the Northeast. They found that ill-defined infections accounted for more than 80 per cent of all illness episodes in children under five. Fever, which included measles and respiratory tract infections, was the most common illness. Only five per cent of all illness episodes could be ascribed to diarrhoea. In contrast, the present study, using prevalence rates for diarrhoea derived from the cross-sectional TDHS data, reveals relatively high proportions of children suffering from diarrhoea; nearly 20 per cent of infants aged 0-11 months suffered from diarrhoea in the two weeks preceding the survey. The rates increased sharply to reach a peak of 27 per cent at ages 12-23 months. However, it is difficult to compare the morbidity outcomes of these studies because of differences in the methods of study. The Khonkaen study was a three-year prospective study, whereas the TDHS was a cross-sectional retrospective study. The Khonkaen study, therefore, takes into account seasonal variation through the course of the study. Moreover, community health intervention programs such as growth charts, home visits, health education, and food supplementation were also introduced during the study and may have had a substantial impact on the morbidity rate in the studied population.

The acute malnutrition results also indicate higher prevalence of wasting among younger than older children. The largest percentage of wasted children, for the Northeast as well as for the whole country, was for those aged 18-23 months. This suggests that young children are more vulnerable to malnutrition and infection. Perhaps feeding patterns are related to the high prevalence of diarrhoea in Thailand, particularly in the Northeast. This is discussed later in Chapter Six and Chapter Seven.

Taken together, the nutritional measurements indicate the extent of both short term or acute under-nutrition and long-term or chronic under-nutrition. Children under one year of age had lower rates of both chronic and acute malnutrition (in terms of both mean z-scores and proportion of children falling below -2 SD) than older children. These results agree with other studies elsewhere, such as those of Bagenholm et al. (1988: 495) and Nestel (1990: 199-200). Young children under one year of age were at greatest risk as a result of malnutrition and infection. However, children under the age of one year were mostly breast-fed. This should provide sufficient nutrient requirement as well as protection of breast milk against infectious disease during the first six months of age. Breast milk is usually not sufficient to meet nutrient requirements after six months. After the first year of life, at weaning age, children are more susceptible to infection, particularly to diarrhoeal disease. This is reflected in the higher prevalence of acute under-nutrition at these ages. The cumulative effects of current malnutrition and infection result in chronic under-nutrition or low height relative to age. Therefore, young children have higher levels of acute under-nutrition due to their increased risk of infection. On the other hand, older children are more likely to be stunted due to their greater durations of exposure to long-term malnutrition.

All nutritional indices seem to suggest that Thai girls are not nutritionally disadvantaged compared with boys in terms of their physical growth as none of the indices showed a statistically significant difference. The Northeast has higher levels of undernutrition on almost all indices compared to that of the country as a whole.

Chronic and severe malnutrition, in particular, are highly prevalent among Northeast children. The remainder of the study will therefore focus on the Northeast region.

6.3 Prevalence of childhood diarrhoea

This section examines diarrhoea morbidity of children under five years of age. The data on diarrhoeal disease were reported by mothers; so an illness was reported only if the mothers perceived that an illness had occurred. This type of data collection may involve measurement errors. They may not be randomised because more educated mothers, for example, may be more likely to recognise episodes. Those at highest risk may have the lowest reporting rates due to such bias. The prevalence rate of diarrhoea in the 24 hours preceding the survey and in the previous two weeks by sex, age of child, and region for the sample as a whole are presented in Table 6.9. The prevalence rate for diarrhoea morbidity was estimated to be six per cent, while the proportion of those who had diarrhoea during the two-week reference period was 16 per cent. Slightly higher proportions of boys than girls had diarrhoea in both reference periods, but the difference was not statistically significant.

Data on the overall prevalence of diarrhoea morbidity for the reference period of two weeks showed that prevalence increased with age from 6 months, at a rate of 18 per cent to a peak at 18-23 months of 24 per cent. At older ages prevalence declined sharply to 15 per cent at 24-35 months and nine per cent at 48-59 months. Although the levels for the reference period of 24 hours were considerably lower, the pattern coincided with that for the two-week rates, except for the oldest age group, in which the rate of diarrhoea morbidity tended to increase. The findings seem to be consistent with the findings on the health status of children assessed by weight-for-height. Diarrhoeal disease was most prevalent among children aged one to two years. This may be one of the reasons why these age groups were more likely to be wasted or to have low weight-for-height than the other age groups.

The diarrhoea data showed little difference in prevalence across regions. The highest prevalence was found in the North for both reference periods, seven per cent for the 24 hour period and 18 per cent for the two-week period. The Northeast had the second highest prevalence of diarrhoea: about 17 per cent of children suffered from diarrhoea in the two-week period.

Table 6.9 : Prevalence of diarrhoea among children aged 0-59 months for the reference period of 24 hours and two weeks prior to the survey by selected characteristics, Thailand, 1987

Characteristic	Percentage having diarrhoea 24 hours	2 weeks *	Weighted no. of children
Sex of child			
Boy	7	18	1754
Girl	5	14	1682
Age of child in months			
0-5	8	18	299
6-11	9	23	341
12-17	10	23	384
18-23	8	24	353
24-35	7	15	672
36-47	2	11	679
48-59	5	9	708
Place of residence			
Urban	4	11	566
Rural	7	17	2870
Region			
Northeast	6	17	1230
North	8	18	653
Central	6	15	649
South	7	17	557
Bangkok	4	11	347
Overall sample	6	16	3436

Note: * Includes 24 hours.

Source: Subset of TDHS 1987 data tape (retry.sps).

The age-specific proportions of children who experienced diarrhoea in the preceding two weeks by region is shown in Table 6.10. Age specific diarrhoea morbidity followed a similar pattern for all regions. In general, diarrhoea began to emerge at an early age with prevalence above 10 per cent for all regions in the 0-5 months age group. In the Northeast and the North, however, the rates start off at very high levels, at about 20 per cent. The rates of diarrhoea morbidity increase progressively thereafter and reach a peak for all regions at age 18-23 months, then

fall sharply and reach rates of lower than 10 per cent in three regions: the Northeast, Central, and Bangkok. The lowest prevalence of diarrhoea for both reference periods was found in Bangkok, while the North was found to have the highest rate of 18 per cent of child diarrhoea for the two-week reference period. The regional variation may be a result of the geographic and other social structure as well as environmental diversity across the country.

Table 6.10 : Prevalence of diarrhoea by region and age of the child in months for the two weeks preceding the survey, Thailand, 1987

Age	Region					
	Northeast	North	Central	South	Bangkok	Total
0-5	20	20	21	13	11	18
6-11	22	22	24	29	19	23
12-17	23	22	16	21	17	24*
18-23	27	21	29	20	22	24
24-35	15	19	13	18	7	15
36-47	10	14	9	12	6	11
48-59	8	15	7	12	7	9
Overall sample	17	18	15	17	11	16
	(1230)	(653)	(649)	(557)	(347)	(3436)

Notes: 1. Figures in parentheses are weighted number of children aged 0-59 months.
2. * Statistically significant $p < 0.05$.

Source: Subset of TDHS 1987 data tape (retry.sps).

Age-specific prevalence of diarrhoea by sex and urban-rural residence are given in Table 6.11. There was no clear pattern by sex or place of residence differences for diarrhoea in the preceding 24 hours. This may be due to the small number of children reported as having diarrhoea within the short reference period. For the two-week period, the level of diarrhoea morbidity began to increase from the youngest age group (0-5 months), irrespective of sex or place of residence, reaching a peak at ages 18-23 months. The rates then dropped sharply to the lowest level among the oldest age groups. Although the general pattern of diarrhoea morbidity was similar, marked differences were observed in the prevalence of diarrhoea between urban and rural children. Diarrhoea morbidity was higher in all age groups for rural than for urban children, twice as high or more for ages 0-5 and 24-35 months. In the youngest age, 0-5 months, about 20 per cent of rural children

had diarrhoea. This rate gradually increased for children up to age two. The high prevalence of diarrhoea among young children, especially in rural areas, may reflect the premature introduction of food supplements together with an unhygienic environment. In most rural villages, access to clean drinking water and sanitary latrines is more difficult than in urban areas. This study will examine this matter in depth in Chapter Seven.

Table 6.11: Prevalence of diarrhoea by age and sex of child, and place of residence for the 24 hours and two weeks preceding the survey, Thailand, 1987

Age	Sex of child (%)		Place of residence (%)	
	Boy	Girl	Urban	Rural
24-hour reference period				
0-5	9	8	3	9
6-11	11	8	6	10
12-17	10	10	3	11
18-23	12	3	9	7
24-35	8	6	4	7
36-47	3	1	2	2
48-59	5	5	2	6
Two-week reference period (includes 24 hours)				
0-5	18	17	9	20
6-11	29	18	17	25
12-17	25	21	15	26
18-23	26	23	19	26
24-35	17	13	7	17
36-47	11	10	8	10
48-59	10	8	7	10
Overall sample	18	14	11	17

Source: Subset of TDHS 1987 data tape (retry.sps).

6.4 Maternal anthropometry

The anthropometric measurements recorded for the mothers were weight and height, which in combination enable the body mass index (BMI) to be calculated. The body mass index is the ratio of weight in kilograms to the square of height in metres. This section first outlines how the information was obtained. The overall distribution of weight and height of ever-married women for the whole country, as well as for the Northeast, is examined in terms of means. This index is intended to

standardise the effect of weight in the measure and has been used widely in determining obesity, although it is rarely used to determine malnutrition in young children (Bray, 1980). One advantage of the body mass index over other relative weight indices is that it does not require the use of reference tables.

Table 6.12 presents the percentage distribution of women by the method of reporting for the anthropometric data. Although the weight and height of most women (93 per cent for the country as a whole) were measured, about two per cent were self-reported. Among the 844 Northeast women, less than one per cent (0.6 per cent) were self-reported and three per cent provided no information. The Northeast women had the highest proportion of women (96 per cent) for whom weight and height were obtained by direct measurement. All women whose anthropometric data were available, excluding 126 pregnant women, were included in this study regardless of how the data were reported.

Table 6.12: Women's anthropometry by method of recording and region (weighted numbers), Thailand, 1987 (Percentage)

Region	Measurement	Self-reported	No data	No. of women
Northeast	96.3	0.6	3.0	844
North	95.1	1.0	3.8	453
Central	91.7	1.8	6.5	453
South	88.5	3.9	7.7	413
Bangkok	89.9	3.6	6.5	257
Overall	93.2	1.8	5.0	2420

Note: Sum of percentages may differ slightly from 100 due to rounding.

The overall distribution of the nutritional status of Thai women using mean weight and height is given in Table 6.13. The average weight of ever-married women was 50 kilograms. The Southern women were lightest (49.4 kilograms), and the Northeast women ranked second lightest (49.7 kilograms), while Bangkok women were heaviest (52.3 kilograms). The mean height of the women was 153 centimetres. Although Bangkok and Central women (153.5 centimetres for both

regions) seem to be the tallest, little variation was observed across the country ($p < 0.001$ for mean weight and $p < 0.01$ for mean height of women).

Table 6.13 : Mean weight and height measurements of weighted numbers of women by region, Thailand, 1987

Region	Weight** (kilogram)	Height* (centimetre)	No.
Northeast	49.7	153.1	827
North	50.0	152.1	438
Central	51.1	153.5	429
South	49.4	152.9	392
Bangkok	52.3	153.5	242
Overall	50.3	153.0	2327

Notes: Level of statistical significance ** $p < 0.001$, * $p < 0.01$.

Data on the body mass index are shown in Table 6.14. Although there was little variation in the proportions of women classified in terms of body mass index across regions, the highest proportion of underweight women was found in the Northeast. Twenty-four per cent of the Northeast women were underweight. As expected, the lowest percentage of underweight women was found in the Central region. The proportion of women classified as overweight was highest in Bangkok. Only 14 per cent of women from the Northeast fell in this category.

Table 6.14: Body mass (obesity) index of weighted numbers of women by region, Thailand, 1987 (Percentage)

Region	Underweight	Normal	Overweight	No.
Northeast	24	62	14	827
North	18	67	15	438
Central	16	66	18	429
South	22	64	14	392
Bangkok	19	56	25	242
Overall	20	64	16	2327

Notes: 1. The cut-off points used to stratify body mass index are: less than 19.00 (underweight); 19.00-24.00 (normal); and more than 24.00 (overweight).
2. Sum of percentages may differ slightly from 100 due to rounding.
3. Chi-square = 29.52, 8 degree of freedom, $p < 0.001$.

The nutritional status of Northeast women by age group and place of residence are shown in Table 6.15. The body mass index or obesity index revealed that the youngest and oldest age groups had very high proportions of underweight women. However, the patterns were inconsistent, possibly due to the small numbers of women in these age groups. Urban women had better nutritional status than rural women. As many as 70 per cent of urban women were considered to have normal nutrition, while the corresponding figure for rural women was 60 per cent. Rural women had a higher proportion of both underweight and overweight (24 and 15 per cent respectively) compared with urban women (17 per cent underweight and 13 per cent overweight respectively).

Table 6.15 : Body mass index of women by age groups, Northeast Thailand 1987 (percentage)

Variables	Underweight	Normal	Overweight	No.
Age group (years)				
15-19	32.3	58.1	9.7	31
20-24	18.8	68.2	13.0	154
25-29	19.7	70.4	9.9	298
30-34	28.6	52.0	19.4	98
35-39	30.0	53.3	16.7	30
40-44	27.8	22.2	50.0	18
45-49	50.0	50.0	0.0	4
Place of residence				
Urban	17.5	68.9	13.6	103
Rural	24.9	60.2	15.0	374
Total sample	23.3	62.1	14.7	100
	(111)	(296)	(70)	(477)

Notes: 1. Figures in parentheses are percentages of women.
2. Cut-off points used to stratify the body mass index are: less than 19.00 (underweight); 19.00-24.00 (normal); and more than 24.00 (overweight).

Generally, the body weight of adults tends to increase with age due to the fact that there is an increased tendency to deposit fat (Malina and Bouchard, 1991: 139). The same pattern was evident among urban women, although the youngest age group (15-19 years) were heavier than those in the ages 20-34. In contrast, no clear pattern was apparent for the rural women. As might be expected in a developing country, younger urban women represented better nutrition in terms of body height than older women. The mean body height fell from 158 centimetres at

age 15-19 years to 150 centimetres in the age group 40-44 years. Once again, an inconsistent pattern was found among rural women. Although younger women were generally taller than older women, women aged 40-44 years had a mean height of 154 centimetres, similar to that of the younger women (Table 6.16).

Table 6.16: Mean weight and height measurements of women by age group and place of residence, Northeast Thailand, 1987

Age of woman (years)	Urban	Rural	Number of women
Weight in kilograms (F = 2.19, 6 d.f., p < 0.05)			
15-19	51.6	47.9	31
20-24	47.8	50.3	154
25-29	48.3	50.1	142
30-34	50.0	49.2	98
35-39	54.5	45.6	30
40-44	53.0	54.8	18
45-49	na	45.3	4
Height in centimetres (F = 0.86, 6 d.f., p > 0.05)			
15-19	158.4	152.5	31
20-24	152.2	153.1	154
25-29	154.6	153.0	142
30-34	151.6	152.9	98
35-39	149.7	151.4	30
40-44	150.9	153.5	18
45-49	na	151.8	4
Total number of women	106 (21)	393 (79)	477 (100)

Notes: 1. na refers to data not available.
2. Figures in parentheses are the percentages of women.
3. Cut-off points used to stratify the body mass index are: less than 19.00 (underweight); 19.00-24.00 (normal; and more than 24.00 (overweight).

Source: Subset of TDHS 1987 data tape (bmi.sps).

6.5 Summary

This chapter has discussed several aspects of both children's and women's health including physical growth patterns and the extent of malnutrition among children aged 3-36 months, the extent of diarrhoeal diseases among children under five years of age, maternal anthropometry, and the patterns of utilisation of preventive health services. The foregoing discussion has suggested not only the existence of regional disparities in health among young children and women in Thailand, but also the complexity of health problems. Taking the standard deviation of weight-for-age,

height-for-age, and weight-for-height against the international standard as the nutrition indices, there was evidence that Thai children were not disadvantaged in terms of physical growth at younger ages (below six months). The z-scores values declined substantially from a level equal to the reference standard at around six months of age to a relatively low value at 18-20 months. A significant difference was observed between urban and rural children, but only slight differences between boys and girls.

Malnutrition in children was highly prevalent in the Northeast where ecological and cultural conditions are distinctive. Children under one year of age had lower rates of both chronic and acute malnutrition than older children. One possible explanation is that, although young children are at high risk of malnutrition and infection, they are mostly breast-fed. This should provide sufficient nutrient requirements for the first six months of life as well as protection against infectious diseases. After the first year, children are more susceptible to infection, particularly to diarrhoea, at weaning age. This is reflected in the higher prevalence of acute malnutrition at ages 12-23 months. The cumulative effects of acute malnutrition and infections result in chronic malnutrition or low height-for-age. Older children are more likely to be stunted due to their greater duration of exposure to long-term malnutrition. All nutrition indices seem to suggest that Thai girls are not nutritionally disadvantaged compared with boys in terms of their physical growth as none of the indices showed statistically significant differences. The Northeast has the highest rates of malnutrition on almost all indices compared to other regions. Chronic and severe malnutrition, in particular, is highly prevalent among the Northeast children. However, growth retardation begins at a very young age in the Northeast. This may be explained in part by the effects of maternal anthropometry, infectious diseases, child care, and seasonal variation. These variables will be explored in depth in the following chapters.

Diarrhoea was most prevalent among children under two years of age. This finding seems to be consistent with the findings on acute malnutrition. Little

difference was observed across regions. Marked differentials in diarrhoea prevalence were observed between urban and rural children. Diarrhoea morbidity was twice as high in rural as in urban areas, perhaps reflecting the premature introduction of food supplements together with an unhygienic environment. In rural villages, clean drinking water and sanitary latrines are less available than in urban areas.

What emerges from the analysis is not only that poor health outcomes exist among Thai children, particularly those in the Northeast, but also that health problems are complex. These fundamental problems, however, are not insoluble if the true nature of problems is understood and the importance to development of such problems is measured. Health personnel in particular, whose work is directly involved in the health and welfare of the population, should be targeted for information concerning these problems. In the hope of providing a clear insight into the complex nutrition and health problems, special attention is to be paid to exploring in depth the underlying principles in the context of the Northeast where these health problems are most prevalent. Also the population in the Northeast is predominantly poor, has a low education standard, is more likely to be employed in agriculture, and is less likely to use preventive health services. The results will be discussed in the following two chapters.

CHAPTER SEVEN

Childhood malnutrition: socio-economic correlates and cultural explanations

Cross-sectional analysis shows that malnutrition and diarrhoeal disease are prevalent in the Northeast. Many studies on malnutrition in Thailand have so far emphasised physiological and medical considerations. Only a few studies have looked closely at wider demographic and socio-cultural considerations, environment, and provision and utilisation of health services. This chapter presents the combined quantitative and qualitative analyses of the correlates of child malnutrition in the Northeast using the TDHS data and field research. Qualitative data drawn from the field research have been incorporated into the analyses in order to provide a clear insight into nutrition problems in a specific rural context. The chapter is divided into four sections. Section 7.1 examines the relationship between sets of explanatory variables and the prevalence of low height-for-age (stunting) in children aged 6-36 months, while Section 7.2 deals with correlates of low weight-for-age (underweight). Section 7.3 presents a profile of the case studies and Section 7.4 the conclusion.

Both bivariate and multivariate analyses were employed for the quantitative analyses, following the same procedures as the analyses performed in Chapter Five. That is, the bivariate relationships between the explanatory variables and dependent variables were examined using the Chi-square test for dichotomous dependent variables and analysis of variance for measures of child anthropometry. Multivariate logistic regression was employed to determine which variables had independent significant effects on the dichotomous dependent variables. In order to detect the explanatory power of all significant variables, the population attributable risk (PAR) relative to each variable was estimated. A number of variables were hypothesised to influence the prevalence of malnutrition including demographic variables, socio-economic factors, water supply and household sanitation, utilisation of preventive

health services, maternal anthropometry, and availability of public health facilities. Age of child and urban-rural residence were used as control variables and were included in each step of model fitting in the multivariate context. Statistics describing the above analyses are reported separately for each dependent variable. The discussion begins with correlates of stunting, followed by correlates of underweight. Children below six months of age were excluded from the analysis of malnutrition due to the possibility of measurement biases (see Chapter Six, Section 6.2.1).

7.1 Correlates of chronic malnutrition or stunting

This section presents the correlates of stunting. Children whose standard deviation units of height-for-age were two standard deviations or more below the median (the WHO-NCHS reference population) were classified as stunted or chronically malnourished. This section begins by describing the relationship between the sets of explanatory variables as mentioned above and mean z-scores of height-for-age and the prevalence of being stunted. Twenty-one out of 27 variables were found to be significantly correlated with stunting at the bivariate level. However, only seven variables remained significant in the final model after controlling for the effects of other variables and control variables.

Bivariate analysis. Differentials in the mean standard deviation units and prevalence of stunting or chronic malnutrition among children 6-36 months of age for the Northeast are shown in Table 7.1. Table 7.2 presents the summary of statistical significance of the variables described in Table 7.1. The overall distribution of the mean height-for-age of the children was 1.39 standard deviations below the NCHS reference population median. On average, Northeast children aged 6-36 months were shorter than expected for their age compared with the reference population. Of 352 children, 27 per cent, or 95 children, were stunted or chronically under-nourished.

Table 7.1 : Mean z-scores and percentage malnutrition among children aged 6-36 months according to selected explanatory variables, Northeast Thailand, 1987

Explanatory variables	Height-for-age z-score	% stunted	Weight-for-age z-score	% under-wt	No. of children
Overall sample	-1..389	27	-1.531	35	352
Demographic variables					
Sex of child					
Boys	-1.380	25	-1.542	33	172
Girls	-1.398	29	-1.521	36	180
Age of child in months					
6-11	-1.041	19	-1.154	28	72
12-23	-1.349	24	-1.550	32	143
24-36	-1.614	34	-1.710	40	137
Age of mother (years)					
15-24	-1.333	27	-1.583	36	143
25-29	-1.293	19	-1.282	22	100
30-49	-1.550	35	-1.689	43	109
Number of living siblings					
one child	-1.256	22	-1.456	36	110
two children	-1.319	25	-1.490	29	122
three or more	-1.583	34	-1.641	38	120
Still breastfeeding					
Yes	-1.391	28	-1.582	39	188
No	-1.386	26	-1.472	29	164
Socio-economic variables					
Mother's literacy					
Secondary or higher	-0.826	15	-0.717	15	46
Primary & literate	-1.389	22	-1.624	45	107
Primary &illiterate	-1.519	33	-1.669	33	199
Father's literacy					
Secondary or higher	-0.899	10	-0.981	24	80
Primary & literate	-1.392	26	-1.591	35	179
Primary & illiterate	-1.804	43	-1.889	43	93
Mother's occupation					
Non-agriculture	-1.062	14	-1.196	25	65
Agriculture	-1.673	39	-1.889	51	72
Not working	-1.393	27	-1.512	32	215
Father's occupation					
Non-agriculture	-1.022	14	-1.147	23	128
Agriculture	-1.599	34	-1.751	41	224
Living with parents					
Live with parents	-1.439	25	-1.602	38	143
Live separately	-1.363	28	-1.503	33	205
Urban-rural residence					
Urban	-0.875	15	-0.894	16	75
Rural	-1.528	30	-1.704	39	277
Ownership of refrigerator					
No	-1.504	30	-1.660	38	299
Yes	-0.739	9	-0.803	17	53
Ownership of radio					
No	-1.756	40	-1.855	48	122
Yes	-1.194	20	-1.359	27	230
Ownership of television set					
No	-1.550	32	-1.716	40	233
Yes	-1.074	17	-1.170	24	119

(continued on the next page)

Explanatory variables	Height-for-age z-score	% stunted	Weight-for-age z-score	% under-wt	No. of children
Ownership of motorcycle					
No	-1.477	30	-1.670	39	268
Yes	-1.107	18	-1.089	20	84
Household sanitation					
Source of drinking water					
Piped or rain water	-1.011	15	-1.014	20	115
Well or others	-1.572	33	-1.789	41	237
Ownership of toilet facility					
No	-1.603	34	-1.819	42	166
Yes	-1.198	21	-1.276	28	186
Utilisation of health services					
Tetanus toxoid injection during pregnancy					
Not given	-1.624	36	-1.790	41	83
Given	-1.315	24	-1.451	33	268
Type of assistance during pregnancy					
Physician	-1.159	20	-1.279	28	148
Nurse or midwife	-1.492	29	-1.625	38	134
Not one	-1.678	37	-1.888	41	70
Type of attendant at delivery					
Physician or nurse	-1.171	19	-1.312	26	212
Traditional midwife	-1.720	39	-1.861	46	140
Ownership of child health card					
No	-1.612	34	-1.772	39	213
Yes	-1.039	15	-1.155	27	140
Mother's anthropometry					
Weight in kilograms					
32.0-44.9	-1.644	37	-1.894	54	87
45.0-49.9	-1.529	31	-1.643	37	103
50.0-54.9	-1.138	20	-1.281	22	82
55.0 or higher	-1.188	19	-1.246	23	80
Height in centimetres					
136.0-149.9	-1.709	34	-1.814	42	96
150.0-154.9	-1.463	30	-1.575	36	130
155.0-159.9	-1.105	17	-1.298	25	87
160.0 or taller	-0.989	21	-1.199	31	39
Body mass index (weight in kilogram/height in square metres) *					
underweight	-1.465	31	-1.679	46	129
Normal	-1.345	25	-1.446	28	223
Access to health services					
Type of public health facility in location					
None	-1.514	31	-1.681	39	173
Health centre	-1.741	36	-1.896	47	70
Hospital	-0.982	15	-1.060	18	109
Distance to the nearest health facility					
< 6 km to HC or HOS	-1.023	16	-1.111	20	116
6 km or longer	-1.569	32	-1.738	42	236
Travel time to the nearest health facility					
< 11 min to HC or HOS	-0.964	15	-1.043	19	102
11 min or more	-1.562	32	-1.731	41	250

Notes: 1. Z-scores -2 SD or below the international reference median are considered low height-for-age (stunted) or low weight-for-age (underweight).
2. * The cut-off point is 19.0 kg/m^2. Underweight is BMI equal to 19.0 kg/m^2 or below, and normal nutrition is otherwise.

Source: Subset of the TDHS data set, 1987 (files hfanw1.sps and wfanw1.sps).

Table 7.2 : Prevalence of malnutrition and selected explanatory variables, Northeast, 1987 (statistical significance of relationship)

Explanatory variables	Height-for-age z-score	Height-for-age % stunted	Weight-for-age z-score	Weight-for-age % under-wt
Demographic variables				
Sex of child	ns	ns	ns	ns
Age of child in months	***	**	***	ns
Age of mother	ns	*	*	**
No. of living siblings	*	ns	ns	ns
Still breastfeeding	ns	ns	ns	ns
Socio-economic variables				
Mothers' literacy	**	**	**	*
Father's literacy	***	***	***	*
Mother's occupation	**	**	***	**
Father's occupation	***	***	***	***
Living with parents	ns	ns	ns	ns
Urban-rural residence	***	**	***	***
Ownership of refrigerator	***	***	***	**
Ownership of radio	***	***	***	***
Ownership of television	***	**	***	**
Ownership of motorcycle	**	*	***	**
Household sanitation				
Source of drinking water	***	***	***	***
Owns latrine	***	**	***	**
Utilisation of health services				
Tetanus toxoid injection	ns	ns	**	ns
Prenatal care	**	*	***	ns
Attendant at delivery	***	***	***	***
Ownership of health card	***	***	***	*
Mothers anthropometry				
Height in centimetres	***	*	**	ns
Weight in kilograms	**	*	***	***
Body mass index	ns	ns	*	***
Access to health services				
Type of health facility	***	**	***	***
Distance to health facility	***	**	**	***
Time to health facility	***	***	***	***

Notes: 1. *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$, NS $P > 0.05$.
2. Statistical tests for percentage stunted and underweight is the Chi-square statistic. The test for the differences in mean is Analysis of Variance.

Source: Subset of the TDHS data tape, 1987 (files hfanw1.sps and wfanw1.sps).

Many studies have shown evidence of differential malnutrition for demographic factors such as sex and age. Sex differences in growth patterns vary across countries. For example, sex disparity in nutritional status of children is uncommon in most Latin American countries (Martorell and Habicht, 1986: 246; McElroy and Townsend, 1989: 215). In a Guatemalan village, boys and girls were equally susceptible to kwashiorkor (Mata, 1978: 299). The analyses of the DHS data from 19 countries revealed sex differentials remained significant after controlling for the effects of other variables in only three countries (Uganda, Zimbabwe, and the Dominican Republic) (Sommerfelt, 1991: 993). In a global assessment of malnutrition, based on nationally representative data available from 76 countries, Carlson and Wardlaw (1990: 27) found that boys appeared to have higher rates of wasting (1.3 times) and stunting (1.1 times) than girls, but no difference was found in the case of underweight.

Chen at al. (1981) investigated sex differentials in malnutrition and childhood mortality in Matlab thana, Bangladesh. They found that mortality rates for girls exceeded those for boys at all ages, particularly at ages 1 to 4 when the death rate for girls was 33.9 per 1,000 compared with death rate for boys of 23.3 per 1,000. Girls showed nutrition deficits in weight-for-age which were three times higher than for boys, and dietary surveys showed that boys get more to eat, an average of 16 per cent higher caloric consumption than girls. Girls were less likely to receive health care when sick. In a study in the Mestizo community in the Equadorian Highlands, McKee (1984: 96) observed sex differentials in weaning practice. Girl infants were weaned at earlier ages, at on average 11 months, compared with boys, at 20 months on average. McKee speculated that this would be influenced by the way mothers transmit attitudes about sexuality and aggression to their infants through nursing, and that males were favoured. Owen et al. (1966) noted that there were sex-related differences in body composition during infancy together with well-recognised sex-related differences in neonatal and infant mortality and in the incidence of certain diseases. This suggests that fundamental physiological processes differ between

boys and girls. However, the inconsistency of findings of the effects of sex on nutritional status of children from previous studies also suggests that it is not only physiological processes which affect differentials in boys' and girls' malnutrition.

Van Esterik (1985: 111) argued that the sex disparity in growth is a reflection of the perceived value of sons and daughters in a society. In some societies, where the value of sons and daughters is more or less equal, such as in South East Asia, sex bias in growth may not occur. In other societies, high levels of dowry and bride price may influence the distribution of food in a family, and that may affect the growth patterns of children. In developed countries, evidence suggests that the nutritional status of boys is usually better than that of girls. Van Esterik also noted that although sex is an important variable, no clear causation of nutritional status differentials has yet been established. The age and sex of the previous child may also interact with the number of children to produce adverse outcomes among girls. Stinson's (1985: 141) review of sex differences in environmental sensitivity during growth and development concluded that males are more sensitive to environmental stress and improvement than females. This is particularly pronounced during the prenatal period, when male growth is uniformly more retarded under conditions of nutritional and disease stress than that of females. In contrast to the growth during the prenatal period, many studies revealed somewhat inconsistent results during the postnatal period. Stinson argues that the inconsistent sex differences in growth during the postnatal period is influenced by cultural practices as well as genetic factors. Evidence from many societies indicates preferential treatment for boys over girls.

In this study, a slight difference between boys and girls in both mean z-score values and prevalence of stunting was observed. The girls had about four per cent more chronic malnutrition than the boys (Table 7.1). Previous studies found that a strong son preference was not evident in Thailand (Prachuabmoh et al., 1974; Knodel and Prachuabmoh, 1976; Kamnuansilpa et al., 1980). Therefore, it is not surprising that the results showed a not significant difference in stunting between

boys and girls. However, if boys are biologically more vulnerable to malnutrition under conditions of nutritional and disease stress (Stinson, 1985: 132) in the absence of strong son preference, the boys should have higher rates of stunting than the girls.

In terms of age differentials, it was assumed on the basis of the growth patterns discussed in Chapter Six that prevalence of stunting varied by age. It is well documented that children during the early years of life are most vulnerable to health and growth impairments due to the fact that their growth and development require proportionately higher quality of food than those of other age groups (Hambraeus, 1982: 1; WHO, 1985; Latham, 1987: 333; McElroy and Townsend, 1989: 207). However, growth faltering rarely occurs during the early months of life even in developing societies, due largely to the nutritive and protective advantages of breastfeeding (Martorell and Habicht, 1986: 252). Children who are breastfed can be assumed to receive adequate nutrition during the first 4-6 months (Jelliffe and Jelliffe, 1978a; Scrimshaw and Underwood, 1980; Underwood and Hofvander, 1982; Whitehead, 1985; Hendrick and Badruddin, 1992: 130). The supplementary feeding is needed thereafter to supply the increasing demand for nutrition, and eventually replaces breast milk. The protective properties of breast milk simultaneously help protect the child from most of the prevalent infectious diseases, including diarrhoea (Cunningham, 1981; Feachem and Koblinsky, 1984: 271; Rowland, 1985: 119; Popkin et al., 1990: 878). It was also assumed that prevalence of stunting increased with age of children due not only to biological factors, but also the shift to supplementary foods.

Given the importance of age at initiation of supplementary feeding, Hendrick and Badruddin (1992: 126) describe that morbidity (due to diarrhoea and food allergies) and malnutrition is most likely to occur if the children are fed too early. On the other hand, weaning too late can lead to faltering growth, decreased immune protection, increased diarrhoea and malnutrition. Although the choice of age at initiation of supplements is still a matter of debate, many nutrition scientists recommended that the supplementary food should not be introduced before the age

of four months and not later than six months (Hendrick and Badruddin, 1992: 130). The present study shows a strong positive association between the age of a child and mean z-score values and the prevalence of stunting. The proportion of low height-for-age was about twice as high for the older children (34 per cent) as for the younger children (18 per cent). This finding is consistent with the hypotheses that linear growth retardation is cumulative. That is, even with the same number of episodes of poor growth each year, older children will have experienced more episodes of poor growth and so will be more likely to be below the cut-off of -2 SD. However, a concrete conclusion cannot be drawn in relation to either the biological or feeding practices from the results obtained in the bivariate analysis. These matters need to be explored in the multivariate context, as carried out later in this section.

In respect of the relationship between age of mother and stunting, firstly it is clear that age of mother has a biological meaning. It is expected that young mothers' nutritional status is less depleted and, therefore, they produce more breast milk, resulting in better child growth. On the other hand, age of mother may reflect the physical and mental maturity to bring up children. Those women who are too young (younger than 20 years) are biologically at risk and less experienced in child bearing and rearing. This is thought to be a disadvantage to the child's health and nutrition. The results of a bivariate analysis of the TDHS data for the Northeast show a curvilinear association between the age of the mother and the height-for-age index of child. In the Northeast, children whose mothers were aged 25-29 years were less likely to be stunted than those whose mothers were younger or older and the relationship was statistically significant at the 5 per cent level. A positive but not significant relationship between the number of living siblings and nutritional status was also observed. If the index child was the only child in the family, nutritional status for both mean height-for-age z-scores and prevalence of stunting was slightly better than if there are two or more children.

A consensus in the literature is that breastfed infants have fewer gastro-intestinal infections, and are heavier and healthier than non-breastfed infants

(Popkin et al., 1983; Butz et al., 1984; Lopez Bravo et al., 1984; Martorell et al., 1985: 25). In developing countries, where environmental sanitation is poor, the protective effect of breast milk appears to be even stronger, especially in the first few months of life (Martorell et al., 1985: 25). Lopez Bravo (1984) conducted research on the growth of infants in an urban slum in Santiago where the population was characterised by low socio-economic status (mothers had little schooling, fathers were casual workers, houses were crowded), but safe drinking water and sewerage systems were provided. It was concluded that even under those conditions, exclusive breastfeeding could sustain normal growth well beyond six months of age.

It was assumed in the Northeast that breastfed children were less likely to be stunted than non-breastfed children. The results showed little association with breastfeeding, in that 28 per cent of children who were still being breastfed were stunted compared with 26 per cent of those who had stopped or never been breastfed. This is not surprising, because the variable describing breastfeeding practice used in the present study did not take into account exclusive breastfeeding and the timing of the introduction of weaning foods. These factors are important in determining the causes of growth impairment in young children. Since this sample only provides information pertaining to the duration of breastfeeding for each child, and not to weaning practices, the variable was defined to represent whether children were still being breastfed or stopped breastfeeding (including never breastfed). From this definition, it can be assumed that breastfeeding is relatively important to the nutritional status of young children whose main source of nutrition was breast milk.

It is believed that the pathways through which socio-economic factors influence child growth are by affecting intermediate causes, such as dietary intake and incidence and severity of infections. Better socio-economic status is believed to increase the purchasing power of households to buy food, to adopt better feeding practices, appropriate health practices and treatment, and to provide better

environmental sanitation (Martorell and Habicht, 1986: 249). DaVanzo and Habicht (1986) argue, however, that improvement in economic conditions may not necessarily result in better growth. Improvement in economic status, such as 'modernisation' in most cities in the developing world, may introduce inappropriate practices, such as bottle-feeding and other changes in eating habits, although some desirable measures, such as improved hygiene and water supply may occur concurrently.

This study examined a wide range of socio-economic variables that are believed to influence chronic malnutrition of young children in the economically disadvantaged regions. The first variable examined was parents' literacy, both mother's and father's. Cleland and van Ginneken (1988: 1357) remarked that in the past 'education typically was regarded as an indicator of socio-economic status'. Many studies have found that parental education has a significant positive association with child health (Cochrane et al., 1982; Behrman and Wolfe, 1984: 117; Cleland and van Ginneken, 1988: 1357; Thomas et al., 1991:185). However, many causal pathways concerning parental education, particularly maternal education, are believed to operate on child health. These include economic advantage (World Bank, 1980: 59; Chutikul, 1982: 20; Konjing and Veerakitpanich, 1985: 179), access to information (Rosenzweig and Schultz, 1983; Kasarda et al., 1986; Thomas et al., 1991: 206), increased decision making power (World Bank, 1980; Engle, 1980), and enhancement of a mother's ability to make use of existing health services, both preventive and curative (Sullivan, 1975: 35; Caldwell et al., 1983: 185; Behrman and Wolfe, 1984: 118; Cleland and van Ginneken, 1988: 1361; Bicego and Boerma, 1990: 18).

Caldwell (1979: 395) argued that the impact of parents' education, particularly of mothers, was a decisive determinant rather than one with an economic meaning. However, the influence of education should not be interpreted in isolation from other factors. Behrman and Wolfe (1987: 200) pointed out that maternal education does not operate directly on child nutrition but is a proxy for unobserved

background characteristics such as underlying maternal health and the environment in which the woman was raised. At the same time, education may also have adverse effects on child health and nutrition since high education is closely linked with working (Leslie, 1985). Working mothers may have less time to care for their children and breastfeed their infants for a shorter period or not breastfeed at all as evidenced in many transitional societies in developing countries. Maternal education is one of the substantive factors influencing the time allocation of the mother. Studies, for example, in rural villages of upper Volta (McSweeney, 1979), Bangladesh (Farouk, 1980), and the Philippines (Ho, 1979), indicate that education of mother is a prime factor determining how mothers budget their time. Ho (1979) also found that the time spent by mothers in the care for young children draws little time from their market production or from their leisure. Many studies have found a negative relationship between mother's work and the nutritional status of young children (Levinson, 1974; Kumar, 1978; Popkin, 1980); Chutikul, 1982). However, Popkin (1980: 11) cautioned that possible reasons for this negative relationship may include factors such as poverty which necessitate the mother engaging in market work. While such studies do not control for individual variation in capacity and efficiency in carrying activities out, most educated women tend to spend less time in household activities than do less educated women.

Working mothers, especially if they work outside the home, may have less time to care for their children. While a child care arrangement is likely to be sought, in Thailand the qualified child care arrangements are only available in big cities and are rather expensive since they are almost entirely private. Therefore, child care by non-relatives is common in most working families in the Northeast. These child care substitutes are usually young women from rural areas with a low level of education. Therefore, the quality of care by the substitute may be low and thus adversely affect the health and nutrition of the children. In a review of women's work and child welfare in the Third World, Leslie (1985) concludes that, although children of working mothers were often malnourished, the causal relationship between mother's

employment and child nutrition has not yet been clearly established. While information about child care substitutes was not available from the TDHS, however, the characteristics and roles of child care substitutes in the context of a rural village in the Northeast will be examined. These may be different from those who work as child care substitutes in cities or towns, where child carers are predominantly older siblings or grandparents.

For education of father, Rosenzweig and Schultz (1982) studied the family's investment in child care by estimating health production inputs of parental behaviour and health outcomes. They pointed out that one pathway through which father's education influences child health outcomes is probably through the influence of education on attitudes and thus its influence on choice of consumption goods, including child care services. Mosley (1984:) notes that the effect of father's education was even more important to child health if highly educated fathers were married to less educated mothers.

In keeping with much of the current literature, a negative and significant association was found between mother's literacy and prevalence of stunting, but a positive correlation with the mean standard deviation height-for-age ($p < 0.01$). Children of illiterate mothers were stunted in about 44 per cent of cases, while the corresponding figures for the primary-educated and literate mothers were only half as high (22 per cent). The lowest rate of stunting was for children whose mothers completed secondary or higher education. However, sound conclusions about the influence of education are impossible to draw from the analysis at this level.

A father's literacy was also negatively and significantly associated with nutritional status of children. The proportions of children who were found to be stunted were about four times higher among those of illiterate fathers than of literate fathers.

A strong association was found between mother's and father's occupation and nutritional status of children. The lowest proportions of stunted children (14 per cent) were found among those whose mothers were engaged in non-agricultural

work, while the largest proportion was in the agriculture category, with a rate of 39 per cent. Surprisingly, women who reported not working at the time of survey had as much as 27 per cent of their children experiencing chronic malnutrition (Table 7.1). This is surprising because it would be reasonable to assume that non-working women would be able to dedicate most of their time to raising their children and giving them better health and nutritional status. Not working may also relate to lack of income. However, the variable describing occupation considered only the current occupation. As discussed in Chapter Three, Section 3.2, the survey was conducted during the slack season before planting. There can be no doubt that the apparently high proportion of women reported not working at the time of the survey is misleading. The father's occupation was also an important predictor of child nutritional status and followed a similar pattern to the mother's occupation.

In studies in both developed and developing countries, urban-rural differences have a significant impact on child nutrition. For instance, Sommerfelt (1991: 986) analysed the DHS data from 19 countries to show that the urban-rural differences in child nutrition were significant in 10 countries, including Thailand, even after controlling for the effects of other variables. Some studies, however, showed insignificant differences between urban and rural nutritional status, for example, in Australia (Jones et al., 1973) and in Holland (van Wieringen, 1978). Minimal differences in growth between big-city and rural children were also reported from developing countries, such Costa Rica (Villarejos et al., 1971) and Mexico (Malina et al., 1981). Eveleth and Tanner (1976) argued that the insignificant differences in child growth in the case of Costa Rica was not an indication of rural and urban dwellers being equally well off, but rather of their being equally poor. Most cities in South America and Africa were highly urbanised only in the sense that they had high population density; otherwise they differed markedly from the big cities of the industrialised world. This is reinforced by findings that the prevalence of protein energy malnutrition was higher among the urban poor and rural children in

Latin American countries (Viteri, 1987: 44), Costa Rica, Guatemala, and El Salvador (Rossi-Espagnet, 1987), and in the Philippines (Adair et al., 1993: 82).

A question can be raised here, however, about what these urban-rural differentials tell us about the quality of the urban versus the rural environment in transitional societies. Both kinds of conditions, favourable and unfavourable, characterise most big cities. The favourable condition, such as better socio-economic conditions, cultural and educational opportunities, sophisticated medical and health services, and safe water and sewerage systems, no doubt enhance the health and nutrition of a population. Nonetheless, some destructive conditions also prevail in most cities: heavy industry, high population density, air and noise pollution, heavy automobile traffic and lack of open space. Those conditions may harm the health of the population.

Adair et al. (1993: 35) argue that, although the simple urban-rural dichotomy is useful for differentiating health outcomes, it is inadequate in interpreting health differentials in such heterogeneous urban and rural circumstances. They demonstrate this by analysing the health outcomes of Filipino infants using the Cebu longitudinal health and nutrition survey. A tighter definition of residence areas was identified using several criteria, including the type and density of housing, commercial and agricultural activities, provision of services and access to developed areas. The residence was classified accordingly into six strata: urban, urban squatter, peri-urban, town, rural, and isolated rural. Adair et al. found that infants in different strata exhibit different patterns of nutritional status and infectious disease morbidity. The most striking result was that infants in the squatter urban or slum areas experienced higher diarrhoea morbidity, while linear growth retardation was marked among infants in isolated rural areas. This reflects differences in environment (community, household, and individual) and behaviour under which children were raised within urban or rural residence. This classification scheme of areas of residence is very useful in distinguish the characteristics and health outcomes of a

specific group. Unfortunately, this cannot be examined in the present study due to lack of information.

The results of this study suggest that rural residence, in contrast to urban living, had a strong influence on child nutritional status in terms of both the rates of stunting and the mean z-scores. As many as 30 per cent of rural children were found to have low height-for-age, while the corresponding figures for urban children were only half as large (15 per cent) (Table 7.1). These findings suggest that urban-rural inequality exists in the Northeast and thus is an important predictor of the health and nutrition of the population.

Ownership of household items was taken as a proxy for the economic status of household. The hypothesis is that chronic malnutrition would be less prevalent for children from households which owned any item than for those whose households did not own any item. Among the variables describing ownership of household items, the prevalence of stunting and mean z-score values of height-for-age of children were lower at a statistically significantly level for children whose households had electricity, and children whose households owned radios, televisions, or motorcycles. Ownership of a radio may act as a proxy for economic status but also as a source of health information. Radio broadcasting in particular is the only information medium that reaches out to rural and remote areas in Thailand, since the languages used are both official and local dialects. The findings suggest that low cost mass communication that is accessible and affordable at the local level, such as a radio, was an alternative means to convey the health messages.

Household water supply and sanitation were assumed to influence the growth of children through a linkage with infectious diseases. Infections, especially diarrhoeal diseases, are easily transmitted through contaminated water or food. The TDHS found that the vast majority of mothers in Thailand gave their infants plain water while breastfeeding (Chayovan et al., 1990: 45). Thus, poor quality of household drinking water could be a source of contamination and cause diarrhoeal infections. In this study, poor drinking water was defined as water from a well,

river, surface water, or pond. On the other hand, satisfactory drinking water was defined as tap, pipe, or rain water. The findings suggest that a satisfactory source of drinking water and ownership of a toilet facility were significantly associated with lower level of stunting. One-third of children whose households relied on well water for drinking were stunted, while slightly less than half this proportion (15 per cent) was found among those households which used rain or piped water. The expected results were also obtained for ownership of a latrine. Children whose households had no latrines were 34 per cent stunted compared to 21 per cent for those with latrines ($p < 0.01$).

In relation to utilisation of health services, this study found that the prevalence of stunting was lower for those children: whose mothers received prenatal care from health personnel; whose mothers were given a tetanus toxoid injection; who were delivered with the assistance of health personnel; and who had health record cards. However, only three variables were found to be statistically significant: type of prenatal care, type of attendant at delivery and ownership of health record cards. These variables represented the previous use of preventive health services. The previous health care usage plays a significant role in determining use of subsequent health care. That is, health care services were likely to be used subsequently if a woman had previously used any type of health services, such as prenatal care (see Chapter Five). Hence, an initial contact with a health provider may in part have determined subsequent use if a woman perceived that health was important and/or developed positive attitudes towards health services as well as providers.

Nutritional status or genetic endowment of parents is recognised as a factor that plays an important role in the growth and development of their children before and after birth. According to the World Health Organisation (1983), the optimal weight and height of women before pregnancy is 55 kilograms and 163.7 centimetres respectively. In fact, the reported mean weights and heights of women in most developing countries are far below the reference standard (Krasovec, 1991: 61).

Therefore, the recommended cut-off points of 40 kilograms for non-pregnant weight and 150 centimetres for height of women are commonly used in developing countries (Krasovec, 1991: 62). Studies in both industrialised and developing countries have shown more desirable health outcomes for both mothers and infants in taller mothers (Papiernik et al., 1981; National Institute of Nutrition, 1982; Harrison et al., 1985; Prentrice et al., 1987), and higher pregnancy weights (Esguerra et al., 1981; Kardjati et al., 1988; Anderson, 1989).

Breast milk is recognised as a prime source of infant nutrition. Malnourished mothers seem to produce less milk than do well-nourished mothers. Jelliffe and Jelliffe (1978b) stated that well-nourished mothers could produce about 600-800 millimetres of breast milk per day during the first 4-6 months of lactation, whereas poorly nourished mothers could only produce about 400-700 millilitres per day. (Note that the ranges have considerable overlap.) The benefit of breast milk can be witnessed from the normal growth of children from various countries in relation to the reference population during the first few months of life. The duration of normal growth may vary across countries. In Honduras, for example, the mean weight of both boys and girls was equal to the NCHS median only during the first three months (Martorell and Habicht, 1986: 245). In Kenya, however, the normal growth in height of children in relation to the standard population was maintained until six months (Oomen et al., 1984: 186). The variation in duration of normal growth may reflect the level of nutritional status of mothers; that is, infants of malnourished mothers tend to have a shorter period of normal growth (Wray, 1991: 71).

Three variables (weight, height, and body mass index (BMI)) were taken as proxies for the maternal nutritional status. The bivariate analysis revealed that the mother's height and weight were significantly and negatively associated with child height and the rate of stunting. Children of lighter mothers were more likely to be stunted than those of heavier mothers, about 37 per cent for mother's weighing 32.0-44.9 kilograms, and only half that (19 per cent) for the heaviest mothers (greater than 54.9 kilograms). The expected results were also confirmed for mother's height,

34 and 20 per cent for mother's height below 150.0 centimetres and those 160.0 centimetres or taller, respectively. The lowest rate of stunting (17 per cent) was found among the height category 155.0-159.9 centimetres (Table 6-1). The slightly higher proportion of stunted children for the tallest height category was possibly due to the relatively small number of cases (11 per cent) falling in this height category. Taking into account weight and height as described by the BMI, the findings are as expected. There was no significant association between mother's BMI and child nutritional status.

One mechanism through which mother's anthropometry is likely to have affected birth-weight is the consistent and strong impact of mother's height on child height. Children born to malnourished women were more likely to be born with low birth-weight (less than 2,500 grams). While it was not possible to analyse this mechanism here, other studies in Thailand, for example the retrospective study among 51,411 singleton babies born in the maternity hospitals in Thailand, confirmed a linear relationship between mother's weight and height, and birth-weight (Nondasuta et al., 1986: 244). Nutritional status of the mother may also represent the social and economic background of the mothers.

Availability of health service facilities was described using the type of public health facility in the location, distance to the nearest public health facility, and time to reach the nearest public health facility. At the bivariate level, all these variables were significantly association with child nutritional status. The most desirable nutritional status of children was found among those living where hospitals were located, with a rate of stunting of 15 per cent and mean z-score value of -0.98 (Table 7.1). Surprisingly, there was little difference in the rates of malnutrition when the presence of health centres and no public health facility was compared.

It is likely that people will use the most accessible health care facility when need arises, so that the time variable reflects not only distance but also the means of transportation and conditions of road access. The variable describing time to the nearest health facility was negatively and significantly associated with the child's

mean z-scores of height-for-age and prevalence of stunting. Sixteen per cent of children who lived within a distance of five kilometres from a health centre or a hospital were stunted, while the figure was twice as high for those who lived further than five kilometres away (Table 7.1). Similar results emerged for travel time: 15 per cent of children with shorter travel times (below 11 minutes) were stunted and 32 per cent of those with longer travel times (11 minutes or longer). In a large majority of rural communities a health centre is the most accessible locus of primary health care. The results seem to suggest that the provision of health centres were not very important for the nutritional status of children. This discussion will continue in later sections.

Multivariate analysis. Multiple logistic regression was employed to examine the complex relationships among the several sets of explanatory variables described above. All the explanatory variables were fitted in the models using a forward stepwise method as discussed in Chapter Two, Section 2.3. The results of the most parsimonious logistic model, including the control variables (age of child and place of residence), are shown in Table 7.3. Four explanatory variables remained significant after controlling for the effects of other variables. In order of significance they were: ownership of a radio, father's education, mother's height, and ownership of a health record card. No interaction effect was observed in the final model. All the PARs corresponding to variables in Table 7.3 were below 0.95; this implies that each individual variable has considerably strong explanatory power. The effect of the control variables, especially age of child, turned out stronger in the final model, while place of residence had a weaker effect than in the bivariate analysis. The effect of mother's education disappeared in the presence of all the variables described above. Further analysis on the pathways through which maternal education affects child nutrition will be discussed in Section 7.1.3.

The findings seem to suggest that there were differential impacts of age of child in producing chronic malnutrition. The risk of stunting increased with the age of child. However, a significant difference was observed only among the oldest age

group, 24-36 months, with relative odds of 2.21 (t-statistic = 2.08) compared with the youngest group, 6-11 months. The risk of stunting was higher (but not significant) among children aged 12-23 months old (odds ratio = 1.17, t-statistic = 0.41) than those aged 6-11 months. Apart from being cumulative linear growth retardation as described above, this can be explained in part by variation in feeding patterns, particularly supplementing breastfeeding with other foods. Food supplementation typically starts at a very young age in Thailand (Kamnuansilpa and Knodel, 1985: 24). This may give rise to problems stemming from poorly prepared foods and unclean water, resulting in high prevalence of diarrhoeal disease at an early age. As Mata (1990: 37-38) points out, infectious diseases such as respiratory infection and diarrhoeal diseases are most common at very young ages and may lead to malnutrition and even death. Breastfeeding during the first few months of life is thought to be a particularly important practice which plays a crucial role in protecting children against chronic malnutrition. The risk of children's exposure to disease pathogens increases during the transition to solid foods. As a consequence, growth retardation begins at an early age. The TDHS data show a marked increase in the rate of stunting during the second half of the first year, and this tended to increase thereafter with the increasing age of the child.

Urban residence had no significant influence on child nutrition after controls for the effect of other variables were introduced. Although rural children had increased odds of stunting (1.33 times) compared to urban children, the relationship was not statistically significant (t-statistic = 0.69). The predictive power of urban-rural residence was channelled through other factors included in the analysis. Urban residents had better education, more favourable hygiene conditions, and better access to social and health services. The result thus suggests a complex interaction between location and other factors that deserves explicit attention. Unfortunately, the relatively small urban sample size which was obtained from the TDHS data may not permit meaningful statistical tests. Therefore, this interaction will not be investigated in depth in this study.

Table 7.3 : Logistic regression parameters relating explanatory variables and low height-for-age (stunted) among children aged 6-36 months, Northeast Thailand, 1987

Explanatory variable	Estimate	SE	t-statistic	Odds ratio	PAR
Age of child in months	(LRX^2 = 6.54, 2 d.f., $p < 0.05$)				0.34
6-11	0.00	-	-	1.00	
12-23	0.16	0.38	0.41	1.17	
24-36	0.79	0.38	2.08	2.21	
Place of residence	(LRX^2 = 8.07, 1 d.f., $p < 0.01$)				0.57
Urban	0.00	-	-	1.00	
Rural	0.29	0.42	0.69	1.33	
Ownership of radio	(LRX^2 = 17.7, 1 d.f., $p < 0.001$)				0.69
Yes	0.00	-	-	1.00	
No	0.88	0.27	3.22	2.42	
Father's literacy	(LRX^2 = 13.1, 2 d.f., $p < 0.01$)				0.54
Secondary or higher	0.00	-	-	1.00	
Primary & literate	0.67	0.46	1.46	1.95	
Illiterate	1.36	0.48	2.80	3.88	
Mother's height in centimetres	(LRX^2 = 8.22, 1 d.f., $p < 0.01$)				0.90
@	-0.07	0.02	-2.83	0.93 a	
Possession of health card	(LRX^2 = 4.13, 1 d.f., $p < 0.05$)				0.64
Yes	0.00	-	-	1.00	
No	0.61	0.30	2.01	1.84	

Notes:
1. Z-scores -2 SDs or below the standard reference median are considered stunted.
2. LRX^2 and d.f. are reductions in scale deviance and degrees of freedom when a variable is added to the null model.
3. @ The variable is treated as a continuous variable.
4. a For each additional centimetre of mother's height.
5. PAR denotes Population Attributable Risk (the acceptable values are less than 0.95 or greater than 1.05), and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.
6. Age of child and urban-rural residence are control variables.

Source: Subset of the TDHS data tape, 1987 (hfapath.sps).

The odds of being stunted for children whose households did not own a radio was 2.42 times those of households which did own a radio (t-statistic = 3.22). There appeared to be little change in the coefficient estimates compared with the bivariate relationship. Although the ownership of radio was interpreted as representing household economic background, having a radio could also reflect access to information, including on health matters.

Children's anthropometry was poorer for those whose fathers were illiterate or who had primary education but could not read at all (odds ratio = 3.88) compared with those of secondary or higher educated fathers. One possible explanation for

this is that father's education is more likely to reflect the social and economic status of the household rather than the quality of child care. In Thailand, fathers are not considered as prime child care givers. Households with fathers who had received higher education had a better opportunity to earn a higher income and were able to provide better nutrition, as well as better child care, compared to those who were illiterate.

The height of the mother was the only proxy for maternal nutrition used in the multivariate analysis. Weight and the body mass index (BMI) or power-type indices were excluded. Although the BMI is the most desirable obesity index widely used because they are highly correlated to body weight and independent of height (Lee, et al., 1981), different power-type indices are recommended to be used for different age groups and sex. For instance, W/H^2 is less height-biased in male adults while W/H is less height-biased for females. All indices (W/H, W/H^2, W/H^3, $H/W^{1/3}$) are considerably height-biased among the population aged 6-17 years. It appears that a power between 2 and 3 is probably more appropriate for most of adolescence (Cole, 1985). The inclusion of women aged 15-49 years in this study may in practice raise difficulties in applying the appropriate power-type indices to specific age groups. In addition, since height-for-age was used as an indicator of the past nutritional status of children, the body mass index of mothers at the time of the survey may have had a different time reference period than the height-for-age index of the children. Therefore, since the study is aimed to investigate poor growth of mother and child size, it is better to use the height rather than BMI.

Mother's height was treated as a continuous variable in the multivariate analysis. As expected, mother's height in centimetres appeared to have a negative effect on the probability of having stunted children ($p < 0.01$) (Table 7.3). Maternal nutritional status, as measured by anthropometry or biochemistry, usually has an important effect on the birth-weight of babies (Niswander, 1969: 428; Peckham and Christianson, 1971: 1; Mueller, 1986: 152; Kramer, 1987). In addition, the nutritional status of the mothers can be considered as a proxy for socio-economic

status, feeding practices and other environmental factors. The greater risk of stunting among children of mothers with shorter stature may reflect the poor nutritional status of the mothers when the children were born. Shorter mothers tend to have shorter babies than do taller mothers. Although catch-up growth may occur when infants are breastfed, this may not reach normal growth since poorly nourished mothers are likely to produce less breast milk to nurture their children.

In the Northeast, there was also evidence that chronic malnutrition was associated with one of the variables representing utilisation of health services, ownership of a health record card ($p < 0.05$). The odds of stunting increased to 1.84 times if a child was reported as not holding a health record card compared to those who owned a health card (Table 7.3). The likely explanation of the effect of possession of health record card on child nutrition is through access to health and nutrition information once the child had contact with health personnel.

Women who consulted health professionals were characterised by higher education (both the women and their husbands), had previously used some kind of health services such as prenatal care, and lived close to a public health facility. In addition to the better socio-economic background of women who used health services, another possible explanation for the influence of usage of health professionals on child nutritional status is that such mothers were able to get access to health resources and to maintain contact with health professionals in areas affecting. Preventive health measures in Thailand focus on young children. For example, the immunisation program provides protection against the five immunisable diseases (tuberculosis, diphtheria, pertussis, tetanus, and poliomyelitis) during the first six months, and measles vaccine is given at around 6-9 months. This contact may help to detect health problems in young children at an early stage. Mothers also gain access to health information including child care practices which may benefit the health and nutrition of their children.

In summary, in the bivariate analysis, six out of 27 variables were not significantly associated with chronic malnutrition: sex of child, number of living

siblings, current breastfeeding, lived with parents, tetanus toxoid injection, and maternal body mass index. Age of children and urban-rural residence were used as control variables and included in every step of model fitting in the multivariate analysis. Four variables, excluding the control variables, were significant after controlling for the effects of other variables. These were ownership of radio, father's education, mother's height, and attendant at child birth. The analysis was not only able to explain a large proportion of the variation in stunting, but also revealed the complexity of the relationships involved. However, the relatively small sample and the lack of some important variables such as exclusive breastfeeding and weaning practices precluded a definite conclusion on the contribution of many variables. The effect of mother's education on child nutrition weakened in the presence of other variables, as did the variables representing household water supply and sanitation. This does not mean that maternal education and environmental factors are not important in predicting child nutrition. The effects of these variables may have been mediated through the variables which remained significant in the final model. The strong influence of utilisation of health services, however, supports the view that preventive health measures are a useful predictor of child nutritional status, even controlling for other variables.

Further analysis on maternal education and child nutrition. The effect of maternal education on child nutrition was very strong in explaining variations in linear growth retardation among children in the bivariate analysis, but was not significant in the presence of the other variables included in the multivariate model (Table 7.3). This indicates that maternal education captures some of the variations in these variables. When controls for the effects of these variables were introduced, the effects of maternal education diminished. To identify those variables included in the final model through which the effect of maternal education is channelled, a model in which there were interaction terms between maternal education and each of the variables was estimated. Changes in model LRX^2 together with the corresponding degrees of freedom were used to test whether the

inclusion of each of the variables led to a significantly increased explanatory power over the gross effect.

For all models, except when height of mother was included, the addition of the interactions resulted in a significant reduction in the coefficient estimates compared to that of the gross effect model (Table 7.4). This decline was especially pronounced when father's education was included (the reduction in $LRX^2 = 1.81$ and $p > 0.5$). The inclusion of place of residence, ownership of radio, father's education, and ownership of health card significantly increased the explanatory power over the gross effect model.

Interestingly, the inclusion of father's education produced an opposite effect on the relationship between maternal education and child nutrition. Children of less educated (illiterate or primary educated and literate) mothers were less likely to be stunted compared to those of secondary or higher educated mothers. This has been found elsewhere. It could be related to the mother's work status. The education of fathers, who are regarded as the breadwinners in Thailand, is particularly important for the linear growth of children because of its effect on income.

Other variables such as place of residence, ownership of radio, and ownership of health record card also appeared to mediate the effects of maternal education and child nutrition. Better educated mothers were likely to reside in urban areas, more likely to own a radio, their children were more likely to own health record cards, and therefore, the children were less likely to suffer chronic malnutrition.

Maternal education acted independently of the height of the mother to influence child nutrition. Although maternal education remained negatively associated with chronic malnutrition when controlled for height of mother, the coefficient estimates changed only marginally.

Table 7.4 : Maternal education and co-variate main effects estimates, Northeast Thailand, 1987

Maternal education	Gross	model 1 ur	model 2 rad	Odds ratios model 3 fed	model 4 ht	model 5 card
Secondary +	1.00	1.00	1.00	1.00	1.00	1.00
Primary & literate	1.52	1.14	1.19	0.49	1.19	1.34
Illiterate	2.70*	1.86	2.00	0.65	2.39*	2.10
Model LRX^2	402.1	389.5	389.6	383.4	391.3	389.7
Degree of freedom	349	348	348	347	348	348
Change in LRX^2	8.48	3.98	4.98	1.81	8.81	4.52
P-value	0.02	0.20	0.10	0.50	0.02	0.10

	model 6 ur+rad	model 7 ur+fed	Odds ratios model 8 ur+ht	model 9 ur+card	model10 rad+ht
Secondary +	1.00	1.00	1.00	1.00	1.00
Primary & literate	0.88	0.45	0.86	1.09	0.92
Illiterate	1.40	0.58	1.59	1.62	1.77
Model LRX^2	386.1	382.8	386.6	387.9	384.7
Degree of freedom	347	346	347	347	347
Change in LRX^2	2.50	1.92	4.90	2.39	5.91
P-value	0.30	0.50	0.10	0.50	0.10

	model 11 rad+fed	model 12 rad+card	Odds ratio model 13 fed+ht	model 14 fed+card	model15 ht+card
Secondary +	1.00	1.00	1.00	1.00	1.00
Primary + literate	0.39	1.06	0.37	0.50	1.05
Illiterate	0.50	1.64	0.58	0.59	1.91
Model LRX^2	3733.1	378.4	372.9	374.9	378.5
Degree of freedom	346	347	346	346	347
Change in LRX^2	2.45	2.98	3.59	1.36	5.43
P-value	0.30	0.50	0.20	0.50	0.20

Notes: 1. * $p < 0.05$.
2. ur = place of residence, rad = ownership of radio, ht = height of mother, fed = education of father, and use = possession of health record card.
3. Changes in LRX^2 are reductions in the scaled deviance when maternal education is added to the models.

Source: Subset of TDHS data tape, 1987 (hfapath.sps).

7.2 Correlates of underweight-for-age

The correlates of underweight among children aged 6-36 months were examined employing a similar procedure to that used in the previous section. The salient findings of the bivariate analysis between these explanatory variables and the complete distribution of the mean standard deviation units are shown in Tables 7.1 and 7.2. A multiple logistic regression analysis was then performed. The final model retains variables significant at the 0.05 level, including the two control variables urban-rural residence and age of child (Table 7.5).

Bivariate analysis. The significant associations between the explanatory variables were observed more frequently for the mean standard deviation of weight-for-age units relative to the WHO-NCHS standard than for the prevalence of underweight (two standard deviations below the reference population). Four variables (sex of child, number of living siblings, breastfeeding practices, and co-residence with parents) were consistently not significant for both the mean standard deviation units and prevalence of underweight measures.

A significant association between underweight and age of child (for the mean z-scores of the reference median only) and age of mother (for both measures) was observed. Prevalence increased with age, with 40 per cent of children underweight at 24-36 months, while the comparative figure for children younger than 24 months was about 28 per cent. Children of older mothers had higher prevalence rates for low weight-for-age than children of younger mothers. However, the lowest prevalence rate 22 per cent was found among children of mothers aged 25-29 (Table 7.1). No association was found between sex, number of siblings, and breastfeeding practice and prevalence of underweight. In Thai society, sons and daughters are equally valued, sons being expected to carry on the family line and to serve in the monkhood, while daughters usually support parents in their old age. Therefore, bias toward either sex in child care or food distribution in the family is thought to be non-existent, which leads to little variation in the malnutrition of children by sex. A

possible explanation for the lack of a significant effect for the number of siblings and breastfeeding is discussed in relation to stunting in the previous section.

As expected, father's literacy was strongly and negatively correlated with prevalence of low weight-for-age ($p < 0.001$). The highest rate of underweight was found among the children of illiterate fathers (43 per cent), while the corresponding figure for primary educated and literate fathers was 35 per cent, and 24 per cent for fathers with secondary or higher education.

Mother's literacy was strongly associated with the rate of underweight ($p < 0.01$). Although children of mothers with secondary or higher education had the lowest prevalence of underweight (15 per cent), the patterns were inconsistent for those of primary-educated and literate mothers (45 per cent) and illiterate mothers (33 per cent) (Table 7.1). The results seem to suggest that maternal education had a significant impact on child nutritional status if the mothers had at least some secondary education. Formal education lower than secondary level had very little effect on child nutritional status. However, as in most developing societies, women in the Northeast who could afford to further their studies were mostly better off socially and economically and were largely urban residents. The majority of rural women had no more than primary education. Sound conclusions on the mechanisms relating to education cannot be drawn without taking other variables into account. Multivariate analysis will be carried out in the next sub-section.

As expected, the occupation of parents was found to have significant influence on the prevalence of underweight. Children whose mothers were employed in the non-agricultural sectors had lower prevalence (25 per cent) than children whose mothers worked in agriculture and non-working mothers (51 and 32 per cent). A similar result was found for the father's occupation. Underweight was more common among rural children than urban, the figures being 39 and 16 per cent respectively. As expected, underweight tended to be less prevalent among children whose households had refrigerators (17 per cent), or radios (27 per cent), or television sets (24 per cent), or motorcycles (20 per cent).

Statistically significant associations were observed between anthropometric status (both mean z-score values and prevalence rate of underweight) and household water supply and sanitation ($p < 0.001$). Children in households using piped or rain water for drinking, or possessing latrines had a lower prevalence of underweight than children from households without these attributes (Tables 7.1 and 7.2).

All variables describing the utilisation of preventive health services (tetanus toxoid injection, type of prenatal care, type of attendant at delivery, and possession of health record card) were strongly associated with mean z-scores of weight-for-age. However, only two variables were significant when prevalence of underweight was considered; these were attendant at delivery and possession of health card. The prevalence of underweight was greater for births which were assisted by traditional birth attendants (46 per cent) than those attended by health professionals (27 per cent). Children who had health cards were underweight in 27 per cent of cases, while the corresponding figure for the non-health card holders was 39 per cent.

For the three variables selected to represent maternal nutritional status (weight, height, and body mass index), Table 7.1 shows that the mean z-scores of weight-for-age were influenced by the weight and height of mothers. It suggests that thresholds may have been important because heavier or taller mothers had children whose mean z-scores were close to the standard median. Body mass index of mothers was also significantly associated with the z-scores of weight-for-age ($p < 0.05$). Mother's weight and body mass index strongly influenced the proportions of underweight children ($p < 0.001$), but no evidence of association was found between height of mothers and prevalence rate of underweight.

All variables representing the availability of health services had significant effects on anthropometric outcomes irrespective of levels of measurement (z-scores of weight-for-age and prevalence rate of underweight). The prevalence rates of underweight were lower where there were hospitals (18 per cent), where distance to the nearest public health facilities (health centres or hospitals) was less than six

kilometres (20 per cent), or travel time (including waiting time) to the nearest public health facilities was less than 11 minutes (19 per cent) (Table 7.1).

The bivariate relationship between the explanatory variables and the dependent variables may be misleading, due to interactions between the variables. To isolate the independent effect of each variable, multivariate analysis was employed. The results are discussed in the following section.

This section examines correlates of underweight using the same set of explanatory variables as employed for chronic malnutrition in the previous section. It is quite likely that the results may not reveal the same sort of significant association, because the weight-for-age index is in fact a 'composite' indicator of acute and chronic malnutrition, it will also depend on the age group being considered.

Multivariate analysis. The results of multiple logistic regression analysis of relative risk of underweight, which used the same analytical procedures the previous section, are shown in Table 7.5. The following variables were included in the model in order of significance after controlling for the effect of other variables including place of residence and age of child: household's possession of radio, height of mother, age of mother, mother's literacy, and type of birth attendant. The explanatory power of these variables was estimated and the results corresponding to each variable were found to be acceptable (PAR less than 0.95 or greater than 1.05).

Variations in the prevalence of underweight were observed among various age groups, with malnutrition tending to increase with age. Significant differences were found among the oldest age group (24-36 months), who were 2.03 times more likely to be underweight (t-statistic = 2.07) than those aged 6-11 months, although the age of child was significant in the bivariate analysis.

The residence of children in rural areas was associated with an increase in the odds of being underweight (odds ratio of 3.03 and t-statistic of 2.80). The coefficient estimates decreased from 1.23 in the bivariate to 1.11 in the multivariate

analysis, indicating that place of residence had a very strong influence on the current nutritional status of children. In addition to the urban and rural disparities in the Northeast that were discussed above, difference in the availability food between urban and rural areas was also important. In urban areas, food is available throughout the year through the market system, while in rural areas food availability may vary and most rural people, particularly the poor, still rely on natural food resources (Kazuo, 1984; Konjing and Veerakitpanich, 1985; Somnasang et al., 1986; Wongcharoen et al., 1988; Saowakontha et al., 1989). According to Saowakontha et al. (1989), the forest provided at least 40 per cent of the total weight of vegetables consumed and about one-quarter of the total weight of animal foods consumed. It was also found that children who lived in a village near natural resource were less likely to be malnourished than those who lived in a village further away.

Rapid economic growth in recent years, together with a changing ecology due to deforestation, has brought about changes in the food system in most parts of Thailand. Rural people had previously entirely relied on growing, hunting and gathering foods from local resources. Those have been drastically reduced by deforestation and population pressure. As a consequence, people are becoming dependent on the market system, which requires a cash income (Kachondham, 1989: 291; Permpongsacharoen, 1989: 191). In rural areas where employment opportunities are limited, people are largely engaged in low-paid jobs such as construction, domestic work, taxi driving, and agricultural activities. Large-scale seasonal migration to other regions is widespread (Panpiemras and Krusuansombat, n.d.: 1). However, most inter-regional migrants from the labour-surplus agricultural areas in the Northeast are engaged in low-income production, such as sugar-cane and cassava plantations in the Central region. Low wages and the rising cost of living has reduced the capacity of the poor to meet their needs for health and nutrition. The quality of food may also have declined, especially when they are transported across very long distances and to remote areas. In a study of the

regional food consumption patterns in Thailand, Konjing and Veerakitpanich (1985: 164) found that the people in the Northeast and the North consumed smaller quantities of meat, poultry, eggs, vegetable and oils than those in the Central region. Food resources, particularly in the rural Northeast, will be discussed in Section 7.3.

There was a statistically strong association between underweight and household ownership of a radio. Children whose households had no radio were 2.54 times as likely to be underweight as were those in household which had a radio ($p < 0.001$).

Age of mother was a stronger influence in the multivariate analysis than in the bivariate analysis ($p < 0.01$). Children whose mothers were younger (24 years or younger) and older (30 years or older) had an increased risk of underweight with relative odds of 1.92 and 2.56 respectively compared to those of mothers aged 25-29 years (Table 7.5). These findings are consistent with previous studies on the biological factors (such as age of mother) affecting the health and survival of children. This J-shaped pattern of current malnutrition in children according to the age of the mother may reflect biological influences and the child care ability of mothers in different age groups. Childcare skills are associated with the socio-economic characteristics of young mothers. Young mothers tended to be more educated and thus more likely to use modern health services which directly expose them to nutrition and health knowledge and practices. This in turn affects child health and nutrition. On the other hand, older mothers who had experience in child care may have had greater ability in child care than younger mothers. The positive effect of this would have been minimised if their attitude towards child care still adhered to the traditional practices. This relationship between age of mother and child malnutrition strongly confirmed the hypotheses that physical and mental maturation and maternal deprivation were important attributes affecting child nutrition.

Height of mother, the variable used as a proxy for maternal nutritional status, was significant after controlling for the effects of other variables. The risk of being

underweight decreased by five per cent for each additional centimetre in height of the mother ($p < 0.01$). As previously discussed, maternal anthropometry was likely to have an important impact on birthweight. A malnourished woman was likely to give birth to a small baby with low weight and/or height for gestation age. The height of mothers in the data set should also reflect their height at the time of childbirth, since there should be little or no change at all in linear growth after age 18-20 years. The results show that the anthropometry of mothers was associated with their offspring's nutritional status, and confirm the important influence of maternal nutrition on growth and development during the early years of life.

Mother's literacy was significant in the bivariate analysis, and remained significant after controlling for the effects of other variables ($p < 0.02$). However, the results were contrary to expectations. In the multivariate analysis, illiterate mothers tended to have fewer children who were underweight than more highly educated women. Children with illiterate mothers had only 0.75 times the risk of underweight (t-statistic = -0.56), while the risk increased to 1.68 times for those with primary education and literate mothers (t-statistic = 1.00). This did not support the hypothesis that an increase in mother's education would improve the nutritional status of children, since educated mothers tend to have better knowledge of sound health and nutrition practices and ways in which to prevent diseases. However, as noted earlier, maternal education may have an adverse consequence on the nutritional status of children by increasing the mother's opportunity to participate in the labour market. This may decrease the time allocated to child care, including breastfeeding, and household work, reducing child health and nutrition if the mother is unable to find a substitute for her time devoted to child care. Other studies in developing countries such as India (Levinson, 1974; Kumar, 1978), the Philippines (Popkin, 1980) and rural Thailand (Chutikul, 1982) have shown that children whose mothers were in the labour force had lower nutritional status than those whose mothers did not work. The mechanism of working mothers has been discussed in the previous section.

Table 7.5 : Logistic regression parameters relating explanatory variables and low weight-for-age (underweight) among children aged 6-36 months, Northeast Thailand, 1987

Variable	Estimate	SE	t-statistic	Odds ratio	PAR
Age of children in months	(LRX^2 = 3.73, 2 d.f., p >0.05)				0.41
6-11	0.00	-	-	1.00	
12-23	0.24	0.34	0.71	1.28	
24-36	0.71	0.35	2.04	2.03	
Urban-rural residence	(LRX^2 = 15.7, 1 d.f., p < 0.001)				0.37
Urban	0.00	-	-	1.00	
Rural	1.11	0.40	2.80	3.03	
Ownership of radio	(LRX^2 = 15.1, 8 d.f., p < 0.001)				0.75
Yes	0.00	-	-	1.00	
No	0.93	0.26	3.54	2.54	
Mother's height in centimetres	(LRX^2 = 7.66, 1 d.f., p <0.01)				0.84
@	-0.05	0.023	-2.16	0.95 a	
Age of mother	(LRX^2 = 8.57, 2 d.f., p < 0.02)				0.86
25-29	0.00	-	-	1.00	
15-24	0.65	0.32	2.01	1.92	
30-49	0.94	0.34	2.78	2.56	
Mother's literacy	(LRX^2 = 7.18, 2 d.f., p < 0.05)				0.88
Secondary or higher	0.00	-	-	1.00	
Primary & literate	0.52	0.51	1.00	1.68	
Primary & illiterate	-0.29	0.52	-0.56	0.75	
Type of attendant at birth	(LRX^2 = 4.41, 1 d.f., p < 0.05)				0.84
Health personnel	0.00	-	-	1.00	
Traditional midwife	0.56	0.27	2.09	1.75	

Notes:
1. Children whose z-score values are two or more standard deviations below the reference median are considered underweight.
2. LRX^2 and d.f. are reductions in the scale deviance and degrees of freedom when a variable is added to the models.
3. @ The variable is treated as an interval variable.
4. a For each additional centimetre of mother's height.
5. PAR denotes Population Attributable Risk (the acceptable values are less than 0.95 or greater than 1.05), and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.
6. Urban-rural residence and age of child are control variables.

Source: Subset of the TDHS data tape, 1987 (wfanw1.sps).

Type of attendance at the birth of the child was found to be significant in the presence of the variables discussed above ($p < 0.05$). The odds of being underweight increased (1.75 times) if the delivery was assisted by a traditional birth attendant (Table 7.5). In Chapter Four, it was noted that users of health care services tended to share a set of other characteristics. It is also possible that access to specific health and nutrition information and prompt treatment when the child falls

ill could help explain how utilisation of preventive health services affects child nutrition.

In summary, variables may have dissimilar effects on children of different measures of nutritional status for a variety of reasons, including differences in the circumstances within the household which in large part, are unmeasurable. The results show that nearly the same sets of the explanatory variables have powerful bivariate relationships with both the chronic and current nutritional status of children. Five variables (sex of child, number of living siblings, still breastfeeding, lived with parents and tetanus toxoid injection) were consistently not significant for both measures. However, the multivariate analysis yielded slightly different results. Three variables consistently significantly associated with the prevalence of both the chronic and current undernutrition after controlling for the effects of age of child and place of residence. These variables were, in order of significance, ownership of radio, mother's height and attendant at childbirth. The similar sort of significant association found in chronic and current undernutrition could be explained by the fact that weight-for-age is a 'composite' indicator of acute and chronic undernutrition as previously mentioned.

The strong effect of mother's height, interpreted to reflect her genetic and health endowment, on the nutritional status of her children suggests that maternal height directly and indirectly affects both long-term and current measures of child nutrition. The variable reflects not only the nutritional status of mothers, but also mother's roles in childcare. In the Northeast of Thailand, the height of mothers was a useful predictor of the health and welfare of the population. Thus policies designed to improve nutritional status and health should take into account the importance of maternal factors, as well as other aspects of socio-economic development.

Both chronic undernutrition and underweight were found to be significantly linked with the use of a modern birth attendant. This suggests that utilisation of health services and contact with health facilities may increase the chance of women

obtaining health information concerning maternal and child health either directly or indirectly from health education programs. However, as previously discussed in Chapter Four, those who used health services were better off in terms of education and other socio-economic characteristics, as well as having better access to health services. This strongly suggests that, although availability of health services, the complex links of socio-economic aspects need to be taken into consideration.

Father's education strongly affected linear growth retardation or chronic malnutrition, while underweight was significantly explained by maternal education. Increased education of father and/or mother is likely to increase household income; however, the roles played by father's and mother's education in affecting child nutrition are quite different. With respect to mother's education, the results indicate that children of illiterate mothers had a lower proportion underweight than primary-educated and literate mothers. This finding is contrary to many studies that have indicated a benefit from formal education. However, there are few if any previous studies that have controlled for the other factors which have been included here. The matter of allocation of time to child care and nurturing may also be considered an obstacle for educated mothers whose jobs normally mean they have less time for nurturing and caring for their young children. The conflict between women's economic roles and child-care roles, however, cannot provide a clear explanation based on the TDHS data. It is speculated that this issue is to be of serious concern in the Northeast, particular in rural areas where the people are still trapped in poverty.

Although the foregoing discussion captured a wide range of socio-economic, biological, and environmental considerations in relation to growth retardation in children, it has not yet incorporated into the analysis the important cultural factors embedded in such problems. The following section explores this and other dimensions of malnutrition by analysing quantitative and qualitative field data gathered from a case study in a village in the Northeast.

7.3 Feeding patterns, childcare and malnutrition: evidence from the case study village

The foregoing discussions have suggested that the variation in malnutrition among young children in the Northeast can be explained by variation in individual and household characteristics, including socio-economic and demographic characteristics, and genetic features as well as the use of modern health services. Although the TDHS data have captured various characteristics of individual, household, and community, several unobserved variables which directly influence nutrition, particularly feeding practices, were not available. The qualitative study was designed to collect information on these aspects.

7.3.1 Infant and child feeding practices (timing, food, sources and preparation)

This section will demonstrate the extent of infant and child feeding practices and how such practices affected child nutrition in Ban Tha. Although lack of representativeness and the smallness of the sample are two major limitations of the data from the field research, both household survey and qualitative data provide insights into the malnutrition problem among the rural poor.

In a review of trends in infant feeding in developing countries, Notzon (1984: 658-659) notes that feeding practices can vary greatly from society to society or even from one group to another in the same society. The variations concern when to begin to supplement and with what foods, and are believed to be determined by the social and cultural environments. The local staple grains are normally used for supplementation. Early introduction of food, even within the first month of life, is common in the Caribbean-Central American region, while in African countries supplements are initiated relatively late, mostly three months onwards. In Asia, however, the age at initiation of food supplementation appeared somewhat between these other two regions.

In Thailand, rice, either alone or mixed with fruit, is usually initiated by the age of three months (Notzon, 1984: 660; Keowying et al., 1990: 111; Tontisirin et al., 1992: 134). The Subcommittee on Maternal and Child Nutrition of the National

Food and Nutrition Committee (Tontisirin et al., 1992: 134) has provided guide-lines for supplementary feeding for infants (Table 7.6). On the basis of the given guide-lines, the infants should be exclusively breast-fed during the first three months of life. Supplementary feeding should then be introduced and both the quality and quantity of food gradually increased thereafter.

Table 7.6 : Guide-lines for supplementary feeding for Thai children age 0-12 months

Age of child in months	Supplementary food
0-3	Exclusive breastfeeding
3	Begin gruel rice and mashed banana
4	Add ground egg yolk, liver, and legumes
5	Add ground fish, green leafy vegetables, pumpkin
6	Begin one meal
7	Add ground meat, begin whole egg
8-9	Give 2 complete meals
10-12	Give 3 complete meals

Source: Tontisirin et al. (1992: 134).

Supplementary feeding practices in Thailand, however, have yet to meet the recommendations. Tontisirin et al. (1992: 134) showed that the patterns of supplementary feeding varied across the country, particularly between the rural residents and the urban poor. Children in rural areas were introduced to less nutritious food such as pre-chewed rice and banana when they were too young but supplementation with nutritious food such as fish, meat, and oil was delayed. In contrast, among the urban poor breastfeeding was terminated early and bottle feeding became increasingly popular. According to Tontisirin et al. (1992: 135) the major forms of malnutrition in the Northeast were inadequate energy density and low-quality protein. Very few children suffer from actual protein-deficiency, providing they have enough energy (it is very unlikely on a rice-based diet). The traditional diet is believed to contribute to such problems because the bulk of the foods are vegetables, and has low fat and protein content. The staple consumed by most Northeasterners, glutinous rice, is considered to be less nutritious than the rice eaten in the rest of the country (Konjing and Veerakitpanich, 1985: 178). Apart

from poverty and a lack of knowledge, many people, particularly the rural dwellers and the urban poor, still adhere to traditional beliefs and behaviours which are considered to be nutritionally inappropriate.

Most infants are breastfeeding for the first few years of life in the case study village. Only six children aged under five and four children aged 3-36 months were never breast-fed (Table 7.7). Reasons for not breastfeeding infants were incompatibility with mother's work (four children whose mothers worked elsewhere), hospitalisation due to complications after birth (one child), and family disruption (one child). Babies were put on the mother's breast when the milk came, but often only after the colostrum was discarded. Slightly more than 60 per cent of mothers of children in both age groups stated that they had given their infants colostrum. The data obtained from focus group discussions of women revealed beliefs about colostrum which included a belief that the first milk was bad or spoiled (three participants), that it was immature (one participant), or tasteless (five participants). All the participants mentioned that their mothers or older relatives had encouraged them to massage the breast to stimulate the milk production, and to discard the first milk. However, if deliveries took place in the hospitals where the mothers and new-born babies were required to stay for a couple of days (two to three days in normal labour and longer in labour with complications) in the postnatal units, the babies were more likely to give colostrum because the mothers tended to comply with health personnel's instructions. A 17-year-old mother described her experience:

> When I gave birth to my baby at the Health Promotion Centre, Region 6, I had to stay there for three days. The doctors advised me to put my baby to the breast on the first day and insisted that I should not discard the yellowish milk. They said that it was good for the baby. Well, I have to follow the doctor's instruction, though my mother-in-law was not happy with that. Nothing happened to my son anyway. No milk came until the second day after birth.

The duration of exclusive breastfeeding was usually short in the case study village. More than half of the one-month-old children were already given supplementary feeding of rice gruel and banana. By the age of three months, almost all children were fed with some kind of supplementary foods (Table 7.7).

Table 7.7 : Feeding patterns among children aged 3-36 months and the under-five, Ban Tha, 1992

Characteristics	Age 3-36 months		Age 0-59 months	
	Percentage	Number	Percentage	Number
Ever breast-fed				
Yes	93.7	59	92.2	71
No	6.3	4	7.7	6a
Total	100.0	63	100.0	77
Given colostrum				
Yes	65.1	41	62.3	48
No	25.4	16	27.3	21
Don't know	9.5	6	10.4	8
Total	100.0	63	100.0	77
Duration of exclusive breastfeeding				
< 1 month	37.3	22	38.0	27
1 month	20.3	12	23.9	17
2 months	5.1	3	5.6	4
3 month	33.9	20	29.6	21
4 months or more	3.4	2	2.8	2
Total	100.0	59	100.0	71
Prelacteal feeding				
Yes	41.3	26	44.2	34
No	50.8	32	46.7	36
Don't know	7.9	5	9.1	7
Total	100.0	63	100.0	77
Type of prelacteal feeding				
Boiled water	65.4	17	58.9	20
Infant formula	26.9	7	35.3	12
Orange juice	3.8	1	2.9	1
Premasticated rice	3.8	1	2.9	1
Total	100.0	26	100.0	34

Notes: 1. Three children were bottle-fed with condensed milk.
2. Numbers of children may not add up to 63 (among children aged 3-36 months) or to 77 (among those 0-59 months old) due to missing cases.

Source: Field survey data sets, 1992.

It was also common to give a baby boiled water, particularly during the first few months, and mothers also drank boiled water. In some cases, however, the babies were given herb water. In the past, it was a common practice to drip water into the baby's mouth using the fingers. Many mothers still maintained this practice, but some preferred to use a spoon or a bottle. Both fingers and utensils could harm the baby's health if the mothers did not wash their hands or clean the bottles properly.

The early introduction of *kao yum* (roasted pre-chewed glutinous rice) was common. Table 7.8 presents the age of the child at initiation of supplementary

feeding by selected type of food among children aged 3-36 months. Nineteen children were fed rice of some kind (*kao yum*, ground regular rice, or cereals) at the age of one month or younger. Fruits such as sugar banana, orange, and mangoes were also introduced at an early age, while animal protein such as pork, chicken, fish, eggs, and vegetables was initiated at a later age (three months of age or older). Some children were given *kao yum* even in the first week. For instance, I visited one baby girl ten days old who had been born in hospital. Her mother practised *yu fai* after returning home, and at the age of seven days, the girl was already being given *kao yum* and banana, though only a small amount, twice a day. Many reasons were mentioned for giving babies *kao yum* at an early age: to empty the baby's bowel, to test whether the baby was able to eat, to maintain traditional practices, and to supplement insufficient breast milk. One woman believed that feeding *kao yum* was appropriate if a baby passed loose stools because the rice would form the stool texture.

Table 7.8 : Age at first introduction of supplementary feeding by type of food among children aged 3-36 months, Ban Tha, 1992

Characteristics	Number of children				
	1 mth	2 mths	3 mths	4 mths +	Total
Rice or cereals	19	22	19	2	62
Animal meat and liver	0	4	35	22	61
Fish	0	5	25	31	61
Eggs	0	11	34	16	61
Vegetable	4	7	33	17	61
Fruit	15	29	12	5	61

Source: Field survey data sets, 1992.

After the meconium was washed out, the mother would often continue feeding *kao yum* to fill the baby's stomach. Sugar banana or *kluew nam waa* was often mixed with *kao yum* to feed the baby. The amount of *kao yum* was increased with the age of children. For example, babies would be fed two or three mouthfuls of *kao yum* at the first feeding, increasing to about ten mouthfuls when the baby reached one month of age. The amount of *kao yum* consumed determined how

much rice would be prepared for the next feeding. It was not until age 5-6 months that the supplementary food was changed to rice and cooked meat.

The usual position for the mother while feeding the baby with supplementary foods was sitting on the floor with legs extended. The baby lay on the mother's lap with its head pointed towards the mother, so that she could easily restrain it. A small ball of *kao yum* was made using fingers and then put in the baby's mouth, followed by drips of water. A few mouthfuls of *kao yum* was given at the first feeding and the amount was gradually increased, depending on the baby's demand. After feeding, the baby was immediately bathed and put into a cradle. Later, the baby would be put on the mother's breast. Often it refused to suck the milk because its small stomach was already full. As a result, breastfeeding was often only given between feedings and at night. Many mothers believed that it was good for babies to consume as much *kao yum* as the babies demanded. An important indication that it had been eaten sufficient food was that the baby should have slept well and not cried. A crying child was often considered to be hungry and in need of supplementary foods.

Four mothers mentioned that they fed their babies commercial weaning foods (*cerelac* was a popular brand name of imported ground cereals that was known in the village), and five mothers gave ground ordinary rice and rice porridge. Except for the relative expense (a tin of 250 grams cost A$ 4-5), it was convenient to feed the baby with the commercial weaning food. Instead of using milk, only hot water was added to soften the cereal. Some mothers stated that they used ordinary rice porridge to feed their children, although ordinary rice was not the staple diet in this village. Rice gruel or rice porridge had become particularly popular because the rice porridge was available in the village store and it was convenient to feed it to young children. Mothers usually bought the rice porridge from the village store or a food vendor. Only one mother of 16 years of age had prepared the rice porridge at home.

Infant foods were normally prepared separately using the normal family or adult foods. None of the basic ingredients usually used in *Isan* (chilli, salt, fish

sauce, fermented fish, monosodium glutamate, and other spices) were used in preparation of the infant food, except for salt and fish sauce. These ingredients were considered to be too strong for young children. Many women mentioned that 3-4 years of age was the right time for children to be given adult food. One woman aged 26 years explained:

> Young children should eat special food which are different from normal family food and the food should be prepared separately. They are too young to eat spicy food, though eventually they can eat everything.

A few types of cooked food such as grilled chicken, pork, liver, fish, or eggs together with rice were repeatedly mentioned by the villagers as weaning foods. The limited range of weaning foods were generally given until the child reached the age of two to three years, when family food was introduced. However, some children might have gradually shifted to adult food at younger ages.

If the supplementary food was prepared, stored, and fed under unhygienic conditions it would increase the chance of contaminating pathogenic organisms causing infectious diseases and impairing growth. Many of the foods used as supplements had relatively low nutritional value, although some more nutritious foods were also given. A few types of food and preparation were commonly used, including chicken, chicken liver, and pork, all grilled. Other available foods, particularly green leafy vegetables and fish, were largely ignored. Although the villagers consumed a wide variety of vegetables, either raw or cooked, vegetables were rarely given to young children. Vegetable was generally introduced relatively late at a round three to four years of age, only after the children had completely shifted to adult foods.

The importance of rice was reflected in the daily meals consumed. I spent a day with one family to observe the foods the family ate, both for adults and children. The type and source of foods are shown in Table 7.9.

The source of food in the village had shifted from traditional production and wild food sources towards market food. In the past, the villagers had relied on foods gathered from their farms and the bush. Although few types of wild plants

and animals were available locally, they were plentiful all year round. Foodstuffs were primarily obtained from local harvest and through exchange of products with neighbouring communities. Local availability of these foods had apparently diminished due in part to deforestation, both from the expansion of farmland as a result of the population pressure and the commercial logging. The increasing use of chemicals in farm production had also devastated wild vegetation and native animals.

Table 7.9 : Type of foods consumed by one family in a day, Ban Tha, 1992

Meals	Two boys (ages 11 and 28 months)	Three adults and a -5-year-old boy
Breakfast	rice porridge one bag each (from village shop)	glutinous rice steamed fish chilli paste
Lunch	roast chicken liver (from village shop) glutinous rice	green papaya salad jungle soup (vegetable and frog) glutinous rice
Dinner	rice porridge one bag each one sausage (from village shop)	boiled eggs chilli paste glutinous rice

Note: Snacks are not commonly served in the village; however, children always ask for foods other than rice between the meals. Foods such as a pack of noodles, jelly, sweets, and ice-cream are among many that children like.

After the harvest season, villagers had formerly grown vegetables on their farm. These were primarily for home consumption, but any surplus was sold for additional income. At the time of the fieldwork, very few families still maintained this traditional way of life. Many relied solely on the market for their foods, including vegetables. Local food plants such as limes, lemon grass, olives, and other green leafy vegetables, though still consumed by the villagers, were rapidly disappearing. Commercial foods and cooked foods from the towns had to a large extent replaced local foods. The extensive use of these new foods in the village could be ascribed to an increase in the number of village stores as well as to the number of food vendors from outside the village who came to sell foodstuffs as well as other consumer goods. Eating habits had inevitably changed. Parents had less control over the choice of foods to be consumed in the households, particularly

among children. Many participants in the focus group discussions and in-depth interviews, repeatedly mentioned the popularity of non-locally produced foods among young children. A 26-year-old mother said:

> Whenever my son has money, he always buys instant noodles. After eating the noodles, he does not want to eat anything. He does not even touch the rice. That is a worry to me.

Another informant 33 years old reported:

> Soon after getting up, my three-year-old daughter always asks for money to buy *pipo* (jelly) from the store. In the afternoon, she wants to buy noodles. If I refuse, she would destroy everything. Nobody can say no to her. She spends at least eight *baht* per day for this stuff.

Although a wide range of foods was available in the village, many were not very nutritious and some could even be considered harmful to consumers due to lack of quality non-locally produced foods by the authorities.

The following case profiles demonstrate infant feeding practices in the case study village. The cases were selected on the basis of the age of the children (< 24 months), type of family (extended and nuclear), and circumstances (healthy child, sick child, and child with loss of appetite).

Bua's family

Bua, aged 24 years, was married with one son, Top, aged 14 months. She gave birth in the maternity hospital and began breastfeeding her baby on the day of his birth. Top was currently breastfeeding, but less frequently than before. A breast milk substitute was also introduced as supplement when he was eight months of age.

Despite encouragement from her husband to terminate breastfeeding, Bua intended to continue breastfeeding as long as possible. According to her husband, breast milk was no longer suitable for the child and was poor quality. She said that her son was relatively thin and weak. More importantly, he did not eat much rice. He should have been able to walk by now, but could not even stand up. His feet were rather floppy and flat. She had given him *kao yum* when he was only three days of age. She prepared *kao yum* by pre-chewing steamed glutinous rice and mixing it with mashed sugar banana, then wrapping it in banana leaves and roasting

it. during the first week, she fed her baby once a day in the morning, and subsequently, twice a day - late morning and in the afternoon.

Bua had changed her son's supplementary food from *kao yum* to steamed glutinous rice with roasted meat such as pork, chicken, and chicken liver when his teeth had erupted at the age of 6 months. She pre-chewed the food before the child was fed. Until this time, the child had not taken any kind of vegetable.

Top could hardly eat a meal, and it took quite a while to feed him. Sometimes she spent as long as one hour, but even then he only took five or six mouthfuls of rice, no matter how much effort she put in. Bua was seriously concerned about this problem. Her son looked thinner than others of his age and his head always got wet at night. These symptoms were known locally as *sang*. Bua thought that *sang* had been common among young children in the previous ten years or so, but was less common at that time. She was not quite sure what caused *sang*. She said it was probably due to her son not liking to eat rice. He drank sterilised milk (250 millilitres) nearly every day. He also liked sweet foods very much - his favourites were jelly (pipo brand) and ice-cream. She spent about 5-10 *baht* just for sweets every day. He cried if he did not get what he wanted. In April 1992, the nutritional status of the child relative to the international standard reference was normal for all the indices used (weight-for-age, height-for-age, and weight-for-height).

Her son fell sick quite often but had never been hospitalised. The most common illness was *wad* (common cold), which he contracted nearly every month. Apart from the common cold, he had *sou* (diarrhoea) twice when he was three and four months old, and lately he had had diarrhoea. He also contracted measles at the age of eight months. He was never left untreated for more than two days. Bua and her husband always took him to a private clinic in towns, recovered well after taking medicine from the clinic. She believed that medicine from the clinic was more effective than that obtained from other places, especially from the health centre. As a result, she never took him to the health centre except for immunisation.

Bua was mainly responsible for the care of her son, particularly during the first five months of age. Her mother and father-in-law had allowed her to stay at home in the previous harvesting season to look after her son. Her husband, who was always busy with his job in town, had little time with the family and occasionally stayed overnight at his workplace. However, whenever he came home he took his son for a motorcycle ride around the village. When her son was 5 months old, Bua had resumed farm and house work. Her son was left with her mother-in-law at home while she worked in the rice paddy field, but she returned home for lunch to breastfeed her son. His demand for breastfeeding during the day decreased, and at this time she had breastfed him twice each day.

Tim's family: Feeding a sick child

Tim, 26 years old, a mother of three sons, continued to breastfeed her youngest son, Tow who was aged 11 months, as usual during the course of an illness. Tow had high fever, a running nose and sore tongue. He often cried and refused to suck the milk. On the day that I visited the family, he could hardly close his mouth and the saliva kept running down his chin. A few kinds of foods were forbidden to him by Tim, including ice-cream, all kinds of dessert with coconut milk, guava and fruit, because of his illness. She believed they would worsen his condition by raising his temperature.

Tim's middle son, Ton, had been sick with similar symptoms a few days before Tow. Ton, aged 28 months, had just recovered from his sickness, and was playing naked with friends of his own age next door. He returned home at 12.20 pm, then asked for money from his mother to buy instant noodles (*mama* was the brand name marketed and known in the village). At first, Tim refused to give him money, but after a while he started crying, getting louder and louder. He eventually got what he wanted. Tim said that Ton was very demanding and always cried when he wanted something. He ate *mama* almost every day. Nong, the oldest son, whom Tim asked to buy the *mama* disappeared then came back shortly with a pack of *mama* in the left hand and ice-cream in the right. He gave the pack of *mama* to Ton

while he licked the ice-cream. Ton tried to open it up, but he was not able to do so started crying again. Tim opened the package for him. It contained dried noodles and seasoning powder. He began eating the uncooked noodles. According to the instructions, the noodles should be cooked, either boiled or fried, before eating. After he had finished the noodles, he continued to eat the seasoning powder.

Ton and Tow ate different kinds of food from adults. Tim normally bought cooked food from the food vendor or the village store for them. She often bought rice porridge for Tow. Tim just cut out the tip of the plastic bag before pouring the porridge into her son's mouth. She said that she sometimes roasted or grilled chicken or pork. According to Tim, weaning foods should be prepared separately from adult foods and no chilli or spices added, except for salt. She said that her sons did not like to eat vegetables, and that neither Ton nor Tow had ever eaten green vegetables. She did not intend to encourage them to eat vegetables because she believed that they would eventually accept vegetables when they grew up.

I was invited to have lunch with the family twice and dinner once. I do not believe that the family modified their foods during my visit. During my first visit, (23 April 1992) I spent the whole day with the family. It was during the slack season, before the plantation season, and they were entirely free from farm work. Tim's husband, Wat, occasionally worked for a daily wage or on contract work in the village or neighbouring villages. For lunch that day we ate steamed glutinous rice, *tom som* (green papaya salad) bought from a village store, *nam prick* (chilli sauce), and ripe mangoes. Mango was abundant and considered an important source of food during that time of the year. Adults as well as children ate ripe mangoes with rice. They encouraged me to eat as much as I could. Nong also joined the lunch. Before having lunch, Pee, Tim's mother, told Nong to wash his hands, and he did so. I noticed that he only used water wash his hands which were then dried with a towel or cloth. Concerning lunch, they did not have any special type of food; they provided whatever they had.

Pleon's family: Feeding a child with anorexia

Pleon, 23 years old, was married with two children (a four-year-old girl and an eleven-month-old boy). The children were born normally in hospitals (a maternity and university hospital). Both were breastfed for no longer than 3-4 months. Pleon had had no intention of terminating breastfeeding so soon, but the children refused to suck the milk. She then gave her son infant formula. During the first three months, he was chubby, but had grown thinner after stopping breastfeeding. Pleon supplemented breast milk with commercial cereal *cerelac* when her son was one month old, but he ate very little. She tried very hard to feed him with a variety of foods and milk, but he always refused. He had accepted soyamilk recently. She kept trying whatever food she thought was good for him and consulted the midwife. She was advised to keep trying and cook special food for the boy. She sometimes bought weaning food from the market. Her son liked fruit (*ma yom*) picked from the garden. He had four teeth and had learned to walk. Pleon was worried about her daughter because she ate very little food with rice, preferring sweets, ice cream, and instant noodles. The family spent about 8-15 *baht* (one-fifth of their daily wage) per day on buying snacks for the two children.

I observed the family dinner prepared on 18 April 1992. The child still had a high fever in the late afternoon. Pleon took him to the health centre just next door, and received two bottles of syrup. He had taken the medicine, but the fever continued. The child was apparently active and played with friends. The father returned from the field with the buffaloes at 5.00 pm. He brought back with him a bucket containing a small bundle of water cress, a small fresh-water eel, and a handful of fresh chilli. After washing his hands, he held his son and looked after him while his wife left for the village store to buy food. The boy was allowed to roam around the house, and I noticed that he picked up *ma yom* from the ground then put it in his mouth. The father let him eat the *ma yom*. Pleon came back with two eggs, a sweet pork sausage (about two inches long), and a small bag of vegetable oil. She prepared the food by frying the egg mixed with slices of sausage. This solid food and the sticky rice was the child's dinner. She fed him a small ball of the rice and a

small piece of the fried egg. He ate a few mouthfuls of food, then started playing with the food. He ate only egg. Pleon encouraged him to have some rice, but he kept his mouth shut. The feeding was kept up for about 20 minutes, then Pleon gave up and offered him a bowl of water to drink. She was not satisfied with the amount of food her son had eaten. Although he liked sweets, she decided not to give them to him for fear that it would stop him eating rice.

Pleon left her son with her mother during the day while she and her husband were working at the cassava farm, eight kilometres away. However, she was cared for him full time during the slack season, while her husband tended three buffaloes. He took them to the field every day, and also fetched water from the tube-well nearby. He took turns to take care of the children while his wife was cooking and doing housework. Pleon and her husband had six years of formal schooling from the village school. They lived separately from their parents, but only about five minutes' walk away. Pleon's mother and other relatives often helped the family to look after the children.

These case observations confirmed that traditional patterns of feeding were maintained to a considerable extent, particularly among infants and postpartum mothers. Breastfeeding was common, but breast milk substitutes had become accepted and were used in a number of cases. Despite extensive contact with modern ideas about child health, as many women gave birth in hospitals, most of the children were given *kao yum* and banana relatively early, even in the first week after birth. The mothers were apparently concerned about the quantity rather than the quality of weaning foods as suggested by the amount of *kao yum* given to infants. Commercial weaning and non-locally produced food, though limited in range, were available in the village stores and widely consumed by children. Vegetables were not usually given to young children.

7.3.2 Choice of childcarer

In most societies, mothers are regarded as the principal child carers. In Ban Tha, too, mothers were the principal caregivers for as many as 90 per cent of

children under the age of one year; the figures were 81 and 84 per cent of children aged 3-36 months and 0-59 months respectively (Table 7.10). However, recent modernisation in Thailand has changed the roles of women. Women are increasingly involved in the labour market in economic roles performed outside the home, leading to increased conflicted with their reproductive roles.

Field research revealed that, although the majority of the women engaged in agricultural work were small landholders, most villagers had flexible work schedules that enabled virtually all the women to care for their own young children. Mothers might take their young children to the field or leave them with older siblings or grandparents while they were working. For breastfeeding babies, these arrangements were sometimes not very satisfactory. However, most farming mothers were available to their breastfeed children during the first few months of life. In contrast, the nature of work of women who worked in the marketplace located outside the village or in the formal sector were not able to continue breastfeeding. As a result, early termination of breastfeeding was likely and breast milk substitutes, both infant formula and condensed milk, were introduced. A child care substitute was usually needed by those mothers, but no institutional child care arrangement was available in the case study village. The villagers relied entirely on other family members such as grandparents and older siblings (Table 7.10).

Generally, villagers maintained traditional childcare practices. All participants considered the role of childcare to be taken primarily by the mothers, especially for infants dependent on breast milk. In contrast, men were less involved in childcare, but were the primary breadwinners. Some fathers were involved in child care, but this simply meant holding, carrying, and playing with their children. Activities such as feeding, bathing, or changing clothes were rarely done by fathers. Fathers occasionally cared for their children if the mothers were absent or busy with housework.

Table 7.10 : Caregivers for children under five, Ban Tha, 1992

Characteristics	3-36 months		0-59 months	
	Percentage	Number	Percentage	Number
Previous caregiver [a]				
Grand parent	7.9	5	6.6	5
Sibling	1.6	1	1.3	1
Mother	90.5	57	90.8	69
Other	0.0	0	1.3	1
Current caregiver				
Grand parent	15.9	10	13.2	10
Sibling	3.2	2	2.6	2
Mother	80.9	51	84.2	64
Other	0.0	0	0.0	0
Overall	100.0	63	100.0	76

Note: [a] The caregivers for children under one year of age.

Grandfathers were another alternative child care giver in the village, but the care they provided was relatively limited, similar to the case of fathers. I observed a seventy-two-year-old grandfather watching his four granddaughters, aged two to five years old (from three families), playing around the household compound. The children's parents, who were working on their cassava farm, often left their children at home to be looked after by the grandparents. On the day I visited, the grandfather stayed at home with his granddaughters. His wife, aged 70 years old, had left to gather wild mushrooms early in the morning. His main responsibility was to watch the children play in a safe place under the house. Lunch had already been prepared and left in the kitchen by their mothers. When I arrived the girls had already eaten lunch by themselves and the grandfather who lived next door had just arrived. He asked the children, 'Have you eaten lunch yet?' They replied 'We have just finished'. He did not ask any further questions about the food they had eaten or whether they had had enough.

I also saw a 14-month-old child cared for by a grandmother after her mother had left home for work in a southern province three months before. The girl's parents had separated four months previously. She was breastfed for nine months, then given infant formula for another five months, finishing 11 cans of formula (150 *baht* per can). At the time I saw her, she was being given condensed milk mixed

with Milo, which was cheaper than the formula. She was also given glutinous rice, grilled chicken, pork, eggs, and oranges. The grandmother had been the principal childcarer since her daughter had left home. She gave up most of her farm work to care for her granddaughter. However, her second son (aged 18 years) also helped her sometimes.

Another example of children being raised in an extended family was that of Tim, who was married with three sons and living with her foster mother. Her mother used to look after the first grandson, whom she regarded as her own child, when Tim and her husband had worked in a factory in Samut Prakarn province. Tim had cared for her other two sons herself. Tim rarely left home even for a few hours. She said taking care of young children was hard work and her mother might not be able to handle the three boys. She managed to go fishing in the nearby river while her sons were sleeping. Her husband helped in the evening while she did the cooking and housework. He was also responsible for fetching water.

Children were also sometimes cared for by older siblings. In 1992, a survey of 77 children under five years of age showed only three per cent of care was by their siblings (Table 7.10). The limited amount of childcare provided by siblings may reflect the high rate of out migration by those who had completed compulsory education, together with the recent reduction in fertility, which affected the size and composition of the family. Although school-age children remained in many families, any childcare they did was performed out of school hours.

Mothers were primarily responsible for child care, particularly during the early years of life. As the children grew up, childcare was shared to some extent by other family members, including grandparents and older children. Parents expected and encouraged older children to look after the younger ones. Both boys and girls performed this task in the village, particularly children who already weaned. This is one of the crucial periods in terms of health since the parents or child care substitute may not fully be involved in daily activities of the children, particularly in feeding and that may put the children at high risk of malnutrition.

7.3.3 Malnutrition among children aged 0-59 months

The extent of malnutrition among children in the case study village is shown in Tables 7.11 and 7.12. Using the same indices (height-for-age, weight-for-age, weight-for-height, and the Waterlow classification) and reference population (NCHS/US) as the TDHS, the data reveal a relatively high prevalence of malnutrition among children under five in Ban Tha. Twenty-six per cent of children were stunted, while the corresponding figures for underweight and wasting were 14 per cent and five per cent respectively (Table 7.11).

Table 7.11 : Malnutrition among children aged 0-59 months by sex and age of child, Ban Tha, 1992

Characteristics	Stunted	Underweight	Wasted	No.
Sex of child				
boy	12	5	2	40
girl	8	6	2	37
Age of child in months				
< 12	4	1	0	14
12-23	4	2	1	14
24-35	3	2	1	14
36-47	4	3	1	24
48 +	5	3	1	11
Total number of children	20	11	4	77

Notes: Children were classified as malnourished if their standard deviation of height-for-age (stunted), weight-for-age (underweight), and weight-for-height (wasted) fell below -2 standard deviations of the mean of the WHO-NCHS reference population.

Using Waterlow's classification, three children (two girls and one boy) were suffering from a combination of stunting and wasting, one child was wasted, and 17 children were stunted (Table 7.12). These figures are much higher than those shown by the growth monitoring record gathered by the health centre. (Only weight-for-age index relative to the Thai standard was used.) This could possibly because children who were malnourished always missed out on the weighing sessions.

Table 7.12 : Nutritional status of children ages 0-59 months classified by Waterlow Classification by sex of child, Ban Tha, 1992

Characteristics	Boy	Girl	No.
Waterlow classification *			
Stunted and wasted	1	2	3
Stunted only	10	7	17
Wasted only	0	1	1
Normally nourished	28	28	56

Note: * Cross-classification between height-for-age and weight-for-height.
Source: Fieldwork data set (sala.sps).

In order to explore the linkages between individual, household, and community factors and malnutrition, the characteristics of the three malnourished children, as well as their households, were examined.

The extent of malnutrition as measured by the above indicators suggested that there were health problems in the case study village. However, many villagers were not aware of the problem of malnutrition. Although three children were classified as suffering from severe malnutrition (both stunting and wasting), the only physical indication of this was that they were smaller (*joey*, *poom*, or *tua lek*) than others at their age. No other clinical signs or symptoms were evidence. Many mothers believed that fever was more serious than malnutrition, which was not considered abnormal if the child was active and able to eat properly. Where children were small, genetics was believed to explain the size of the child. One informant, referring to a family whose child was healthy, observed that:

> If both the father and the mother have a large body build, their children are most likely to be large too. For example, Mr Charn and his wife, they are both big. Their daughter, therefore, is big. On the other hand, parents of small body size will bear small children.

However, another woman, aged 42, argued that this was not always true. She said that small parents were also able to raise healthy and chubby children. As she pointed out:

> Take the case of the midwife, she is tiny and slim, but her son is big and chubby. I think that is probably because the family can afford to buy good quality food for him. He drinks milk every day. By contrast, our children eat whatever we have and we follow what our parents used to do.

Frequent illness, changes in weather and eating too much fruit were also believed to explain small size. Some mothers did not worry whether their children were thin as they believed that thinness was a natural processes of child growth.

7.3.4 Case profiles of malnourished children

There was evidence that malnutrition was common in Ban Tha but it was locally recognised. The following case profiles are given to support this observation. The characteristics of the three children with severe malnutrition (both stunted and wasted) are shown in Table 7.13. The malnourished children were between 33 and 53 months of age. Their parents had received only primary education and the households were relatively poor. One girl was raised in an extended family, while the other two children were born to nuclear families.

Um. Um was 33-month-old when I first visited her on 28 April 1992. She was the youngest child in a family of nine that included her grandparents, a six-year-old sister, and a four year old cousin. She was born at home, attended by the midwife, so information on her birthweight was not available. According to her mother, the child was born at term without any complications. Traditional postpartum confinement and food restrictions were strictly observed. During the 12 days of the postpartum resting, the mother consumed only grilled glutinous rice and salt. She did not resume normal food until two months after childbirth. The girl was relatively healthy for the first few months. Colostrum was not given, but breastfeeding continued for nearly two years. The baby was given *kao yum* in the first week of birth, and animal protein was initiated at the age of six months. At the time of observation, she consumed normal family food, including spicy food.

Um had received completed immunisation, including measles vaccine. She had contracted pneumonia twice, when she was eight and 20 months old, being hospitalised for about five days during the first episode of pneumonia. Since then she had been ill quite often due to common cold and fever. Treatment was always sought for severe illness, such as high fever for more than two days and diarrhoea.

However, self-medication was first sought. The girl was small compared to children of her age, but was active and cheerful. The health worker informed the family that the girl was malnourished and she was recruited to participate in the supplementary feeding program in 1991 and 1992. Apart from supplementary food (a coupon exchanged for eggs or meat in 1991, and a bag of fresh milk in 1992), they also received nutrition education from the health centre. However, the family firmly believed that frequent sickness was the main cause of her malnutrition.

Um's parents had received only primary education and were semi-literate. They worked in Bangkok as bakery workers before marrying. The mother was born in the province that had the highest prevalence of malnutrition in Thailand, Srisaket province. Growing glutinous rice and cassava were the main activities of family members, while sale of cassava was the major source of income. The family was relatively poor by village standards.

Um had been cared for primarily by the mother until she changed to weaning foods when she turned two. In 1992, she was mainly looked after by her grandparents (72-year-old grandfather and 70-year-old grandmother), particularly during the day when her parents went to work. She was given three meals with one or two snacks per day. The mother was responsible for feeding the child the morning and evening, while lunch was given by the grandparents. Most of the snacks purchased were chosen by the child, including jelly, ice-cream, and confectionery. The child always played with older children aged four and six years.

Joy. This family lived next to household number 91, and the children always played together. The 53-month-old girl, Joy, was the youngest child in the family. Like her other siblings, she was born in the maternity hospital on the town. Her mother had undergone sterilisation after having her third child. Joy's birthweight was 2.8 kilograms and her length at birth was 48 centimetres (data obtained from the health record card). She had received complete immunisation for her age including measles vaccines.

The child's nuclear family consisted of father, Boonmee, mother, Somrose, a son, and two daughters. Although the parents had four years of formal education, the mother was illiterate. She had never lived outside the village. The family owned 42 *rai* of cultivated land (six *rai* of rice paddy and 34 *rai* of cassava farm), only half which was arable. A shortage of labour was a major problem for the family's agricultural activities. Boonmee was the only full-time worker, while his wife did the housework and looked after the children. The main source of cash income was the cassava farm, and the husband worked as a vendor during the slack season. Although Boonmee earned additional income, the amount was only between 4,000 and 5,000 *baht* per year and almost half of that was used to hire additional labour during the planting season. Joy was cared for mainly by her mother and occasionally by her older siblings (aged seven and nine years). While the husband was away, all the housework and household responsibility were carried by the wife.

Joy was small compared to other children of her age. She was frequently ill and ate very little. Somrose believed that this was the effect of her low milk production after the sterilisation. When Joy was young, she always had wet hair at night after crying and wailing, symptoms that were described locally as *sang*. The father bought *yaa kae sang* medicine from a drug store in town and the girl had taken the medicine up to the time when I observed her. The father, who seemed to dominate the decision making process in the family, strongly believed in the superiority of medicine rather than preventive for *sang*. Drugs were used extensively both by children and adults in the family. The girl was recruited to the supplementary feeding program by the health centre, and received a bag of fresh milk once a day between March and May, 1992. The health workers delivered health and nutrition education to the mother only, although the father seemed to be the key decision makers. A little improvement in the nutritional status of the child as measured by weight-for-age compared to the Thai standard was observed at the end of the supplementary program.

Daeng. The nuclear family consisted of three members (a 23-year old father, Sman, a 25-year old mother, Dam, and a 51-month old son, Daeng). Although the family lived separately from other relatives, the house was located close to the extended family compound, and Daeng was often looked after by other relatives (grandparents and an aunt). The family did not hold any cultivated land, but worked for payment in kind with the husband's parents. A major source of income was agricultural work on a sugar cane farm in the central province during the slack season, earning an average of 5,000-7,000 *baht* per year. When the parents migrated to the central province to do this seasonal work, the child was left with a 17-year-old aunt who lived next door.

Daeng was born at full maturity at home, attended by the midwife. The mother practised *yu kam* for eight days and observed food restrictions, consuming only grilled rice and salt. Daeng was breastfed for a year. *Kao yum*, the main supplementary food, was initiated just one day after birth, while animal protein was given at the age of five to six months. He was considered as healthy as other children of his age, and had never been hospitalised. According to his mother, he had received complete immunisation and occasionally participated in growth monitoring at the health centre. The family had never been told that their son was malnourished. He was not included in the supplementary feeding program because he missed out on the weighing session in August 1991.

Although his aunt cooked for Daeng, he preferred cooked foods, including desserts, bought from the village stores. Instant noodles were his favourite dish. The parents were not worried at all about Daeng's eating habits. They considered consumption of non-locally produced foods to be sufficient and convenient. Feeding was largely dependent on the child's demand. The family allow him to play freely, even outside the home, and did not control his meals or eating habits. Daeng often skipped meals while he was playing with friends in the village.

Table 7.13 : Summary of case profiles of severe malnutrition, Ban Tha, 1992

Characteristics	Um	Joy	Daeng
Age of child in months	33	53	51
Sex of child	girl	girl	boy
Age of mother	27	33	25
Age of father	27	36	23
Number of siblings	2	3	1
Household members	9	5	3
Age at weaning (months)	1	3	1
Type of family	Extended (male headed)	Nuclear (male headed)	Nuclear (male headed)
Own radio	No	No	Yes
Own TV set	Yes	No	Yes
Own refrigerator	No	No	No
Land ownership	9 *rai*	42 *rai*	landless
Education of mother	Primary	Primary	Primary
Education of father	Primary	Primary	Primary
Occupation of father	Farmer	Farmer	Agr worker
Major source of income	Both	Husband	Both
Postpartum resting	Yes	No	Yes
Food restrictions	Yes	Yes	Yes
Place of childbirth	Home	Hospital	Home
Contraceptive	pill	sterilisation	pill
Weight of mother (kg)	42	54	45
Height of mother (cm)	151	154	150

Note: Malnutrition expressed by the cross-classification of height-for-age and weight-for-age relative to the WHO-NCHS reference population.

In summary, malnutrition appeared to be common in the case study village. However, the problem of malnutrition was not locally recognised. Although many parents admitted that their children were thinner than other children of their age, they were regarded as healthy in the absence of illness. Loss of appetite, however, was one of the major concerns repeatedly mentioned by the villagers, although the parents exerted little control over the type of foods the children consumed.

7.4 Conclusion

This chapter has examined socio-economic correlates of malnutrition for children aged 6-36 months using the TDHS data. Qualitative analysis was also incorporated

into the study to explain the cultural influences in a rural village in the Northeast. Two nutritional measurements (stunted and underweight) were examined for each child using the same sets of explanatory variables. As described in Chapter Two, Section 2.4, these measures represent different nutritional status; stunting indicates the past nutritional status of the children whereas underweight is 'composite' for the past and acute malnutrition. Therefore, the importance of malnutrition may be significantly explained by different variables. The TDHS analysis revealed that three variables (ownership of radio, height of mother and type of attendant at childbirth) were consistently significantly associated with the prevalence of both chronic malnutrition and underweight while holding constant the age of child and place of residence. This indicates the importance of the maternal factors and behaviour in influencing the nutritional status of children, particularly low weight of the children.

The effects of maternal education on children's nutrition are not uniform; that is, maternal education was not significantly associated with stunting, but the effect was strong for underweight. Utilisation of health services is a possible pathway through which education operates to affect child's growth. Many studies have indicated that mother's education plays an important role in determining household nutrition and health (Heller and Drake, 1979; Rosenzweig and Schultz, 1982; Behrman and Wolfe, 1984; Barrera, 1990). There has been increasing recognition that education, particularly of women, has been an important way to improve nutrition and health in developing countries (World Bank, 1993). In order to improve the general level of education of women, long-term intervention is required. In the short term, however, imparting specific knowledge on nutrition as well as other types of health education may also have the desired impact on the health and survival of children. For example, a small-scale study in Indonesia indicated that educated mothers had greater awareness of the function of immunisation, and that it was the possession of this specific knowledge, rather than formal education *per se*, that led mothers to ensure that their children were immunised, because uneducated

mothers with the same specific knowledge were just as likely to have their children immunised (Streatfield et al., 1990).

Both chronic malnutrition and underweight were found to be significantly linked with the use of a modern birth attendant at delivery. This suggests that utilisation of health services and contact with health facilities may increase the chance of women obtaining health information concerning maternal and child health, either directly or indirectly, from health education programs. However, as previously discussed in Chapter Five, those who used health services were better off in terms of education and other social background characteristics, as well as having better access to health services. This strongly suggests that, although availability of health services is an important factor influencing utilisation of the available health services, the complex links of socio-economic aspects need to be taken into consideration.

The analysis also shows not only that poor nutrition existed among children in the Northeast, but also that nutrition problems are complex. The distinctive ecological and cultural context of the Northeast, compared with the rest of Thailand, seemed to be an important factors. Cultural context seemed especially significant. The case profiles demonstrate, for instance, that although most children were breastfed, many of them were not given colostrum, and they were given supplementary food too early. Undernutrition was considered to be a less severe health problem. There was evidence that some villagers believed that smallessness in young children could be prevented by taking a certain kind of medicine which was locally available. Although almost births in the village occurred in the hospitals and health centres, the supplementary feeding has yet to meet the recommendations. Malnutrition was not prevalent among young children under six months of age, according to all the evidence including the cross-sectional data from the case study village.

Poverty, lack of education and low utilisation of preventive health care undoubtedly contribute to malnutrition and themselves require long-term solutions.

However, the problem of malnutrition is not insoluble in the short-term. Health personnel, in particular those whose work is directly involved in the health and welfare of the population, should be made more aware of the importance of health education in addressing the underlying causes of health and malnutrition problems.

CHAPTER EIGHT

Childhood diarrhoea: socio-economic correlates and cultural explanations

> The causes of diarrhoeal diseases have traditionally been ascribed to water supply and sanitation. In attempts to prevent such diseases, efforts by governments and nongovernmental organizations have focused on and sometimes been limited to improving water supply and sanitation as well as promoting and protecting breast-feeding ... it appears that current efforts are not sufficient to prevent diarrhoeal diseases: education of mothers in food safety principles, particularly weaning food, must also receive high priority. (Motarjemi et al., 1993: 79)

This chapter presents the findings on the correlates of the prevalence of diarrhoea and treatment among children under five years of age in the Northeast. The analysis uses the same procedures as performed in the previous chapter. Section 8.1 describes the specific relative importance of individual explanatory variables on the patterns of diarrhoea prevalence. These include demographic and social variables, environment, previous health care utilisation, and availability of health services. Section 8.2 discusses the results of the final model obtained from the multiple regression analysis; Section 8.3 examines the pathways through which maternal education operates to influence child diarrhoea; Section 8.4 presents the relationships between nutritional status and diarrhoea; Section 8.5 examines in details treatment of diarrhoea; and Section 8.6 deals with evidence on the treatment of child illness from the case study village.

8.1 Bivariate analysis

The patterns of influence of selected sets of explanatory variables will be explored in this section. In the overall sample of 684 children aged 0-59 months in the Northeast, 15 per cent of children were reported as having had diarrhoea during the two weeks prior to the survey. In the bivariate analysis, fourteen explanatory variables, but not the variables describing the use of health care services, might have been responsible for explaining the variations in prevalence of diarrhoea. Diarrhoea was highly prevalent among several groups of children: those aged 12-23 months; those who were currently breastfeeding; those whose mothers were illiterate; those

whose fathers were illiterate; those whose fathers were engaged in agricultural work; those who resided in rural villages; those whose households did not own radios, refrigerators, or motorcycles; those whose households relied on water from wells for drinking; those whose households had no toilets; those who lived in locations with health centres; with a travel time to the nearest public health facility was greater than 60 minutes; and further than 15 kilometres from the nearest public health facility. The following sections explore some possible explanations for the bivariate relationships between diarrhoea morbidity and selected explanatory variables, without taking into account the effects of other variables. The explanatory variables will be considered under four headings: demographic factors, socio-economic characteristics, household water supply and sanitation, and use of health services and access to health resources.

Demographic factors. Five variables describing demographic characteristics were examined: sex of child, age of child in months, age of mother, number of living siblings, and current breastfeeding status. Only two variables, age of child and current breastfeeding status, were found to be significantly associated with the prevalence of diarrhoea in the bivariate analysis (Table 8.1).

Although no statistical significance was observed, boys (18 per cent) had a higher risk of diarrhoea morbidity than girls (13 per cent). This result may reflect actual physical differences that disadvantage boys compared to girls. However, if mothers value sons more than daughters, the reported occurrence of diarrhoea could be higher for boys than girls. In that case, this result may in part indicate son preference. Biologically, males are more affected by nutritional and environmental stress than females during the growth and development process (Greulich, 1951; Markowitz, 1955; Sutow et al., 1965; Stinson, 1985). In a review on sex differences in environmental sensitivity, Stinson (1985: 141) concludes that sex differences in childhood morbidity and mortality show somewhat different patterns in developed and developing countries. In developed countries, females have lower mortality and lower incidence of infectious diseases, such as respiratory and gastro-intestinal

infections, than males during early childhood, whereas little or no differences at all are observed in developing countries. The inconsistency in sex differences may arise due to preferential treatment of male children in developing countries. Sex differences in child care in favour of boys are well known in some cultures (Chen et al., 1981; McKee, 1984), although sex bias is unlikely in Thailand. In Thai society, however, boys are allowed to play freely and their eating habits are less restricted than girls (Bunnag et al, 1989: 35). This may lead to greater exposure to pathogens for boys than girls.

Table 8.1 : Children under five having diarrhoea during the two weeks prior to the survey according to demographic variables, Northeast Thailand, 1987 (Percentage)

Variables	Percentage having diarrhoea No	Yes	Number of children
Sex of child ^{ns}			
Boys	82	18	341
Girls	87	13	343
Age of child in months ***			
0-5	86	14	56
6-11	78	22	74
12-23	73	27	144
24-47	88	12	271
48-59	93	7	139
Age of mother in years ^{ns}			
15-24	83	17	226
25-29	89	11	200
30-34	82	18	147
35-49	83	17	111
Number of living siblings ^{ns}			
One	83	17	172
Two	89	11	249
Three or more	82	18	263
Still breastfeeding **			
Yes	79	21	250
No	88	12	434
Overall sample	85	15	684

Note: *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$, ^{ns} $P > 0.05$.

Source: Subset of the TDHS data tape, 1987. (soufin.sps)

The substantial differences in prevalence of diarrhoea that were found in the various age groups in this study were highly significant ($p < 0.001$). Diarrhoea

morbidity was more common among those under two years of age. The largest proportion of diarrhoea was found among children aged 12-23 months, who had a rate of 27 per cent. The second largest proportion (22 per cent) was found among children aged 6-11 months, and 14 per cent of children aged 0-5 months were also affected (Table 8.1). A marked decline in the prevalence of diarrhoea was noticeable after the second year, falling to seven per cent for the oldest age groups, 48-59 months.

The highest prevalence rate of diarrhoea at the ages of 12-23 months coincides with the very high proportion of children who were wasted or had acute malnutrition, as described in Chapter Six. This may be explained by supplementary feeding, which often introduced at a very young age for Thai children, particularly in the Northeast (see Chapter Seven, Section 7.3). Coupled with environmental deprivation in the Northeast, young children would be more prone to diarrhoeal infection. In their study on mortality, health and infant feeding practices in the Northeast, Kamnuansilpa and Knodel (1985: 24) demonstrated that children were fully breast-fed for a median time of less than a week.

The introduction of foods other than breast milk is likely to allow the infant's exposure to diarrhoea pathogens, and therefore exclusive breastfeeding for the first 4-6 months should be promoted (Tomkins and Watson, 1989: 4). Imong et al. (1989) studied the bacterial content of infant weaning foods and supplementary water in rural Northern Thailand and found that the weaning foods and water contained bacterial counts greater than the internationally recommended safe level. Household hygienic practice, particularly food preparation (pre-mastication), poor cleaning and re-use of utensils was believed to be the major mode of bacterial contamination of weaning foods and water. Even if the water is boiled, this may not reduce bacterial counts. In a review of risk factors for diarrhoea and associated malnutrition, Motarjemi et al. (1993: 79) pointed out that food contamination is one of the major factors causing diarrhoea and malnutrition in young children and that the efforts which emphasise improving water supply and sanitation and promoting

breastfeeding are not sufficient to prevent such diseases. Efforts should be made to improve the hygienic quality of weaning foods, particularly through health education in food safety.

Although the relationships between age of mother and child diarrhoea were not statistically significant, children belonging to the mothers ages 25-29 years, appeared to have the lowest rate of diarrhoea prevalence (11 per cent). Since education of the mother varied according to her age, and only those aged 20-35 had secondary or higher education (data are not shown here), this variation could be due to the higher education of this age group. The number of living siblings was another demographic variable that showed no significant association with diarrhoea.

The data indicate that diarrhoea was more common among the children who were currently breastfeeding, with 21 per cent for those still breastfeeding and only 12 per cent for those who had stopped breastfeeding or had never been breastfed at all (Table 8.1). However, when controlled for age of child (data are not shown here) no statistical difference was observed. As discussed in Chapter Seven, breastfeeding provides young children not only with suitable nutrients for their growth and development, but also with protection against common infectious diseases. While this was not supported by the bivariate analysis, this does not mean that breastfeeding was not beneficial. In studying the effects of breastfeeding on child health and nutrition, the dichotomy of whether or not the children were breastfed may not be a good indicator taken in isolation without consideration of other factors such as age of the child. More information in relation to, for example, the extent of exclusive breastfeeding, whether or not the children were given colostrum, and weaning practices would also be needed to provide a complete picture. However, these data were not collected in the TDHS survey.

Diarrhoeal diseases are more effectively prevented among exclusively breastfed infants than non-breastfed infants, particularly in underprivileged communities. However, the protective property of breastfeeding is diminished if the child is partially breastfed (Rowland, 1985: 119; Tomkins and Watson, 1989: 4). In

the Cebu longitudinal health and nutrition study in the Philippines, Briscoe et al. (1991: 193) found that the prevalence of diarrhoea was statistically significantly lower for children who were exclusively breast-fed than for those who were ever breastfed. Gopalan (1990: 14) argued that breastfeeding is common practice in most Asian countries because of economic necessity and cultural preferences. The need for breastfeeding should not be targeted, but the optimal time for the introduction of recommended foods. Those who live in poor environmental conditions and lack a clean water supply and sanitation should continue exclusive breastfeeding until the age of six months. For the purpose of prevention and management of diarrhoeal diseases, Tomkins and Watson (1989: 5) maintained that, although breast milk is not sufficient at more advanced ages, breastfeeding should continue into the second year of life. This should be accompanied by an increase in both the quantity and quality of weaning foods.

The high rates of diarrhoea among children who were currently breastfeeding can be readily explained when linked to feeding patterns and the age of the children. As discussed above, Thai children, particularly in the Northeast, are introduced to semi-solid foods very early, even in the first week of life. This enhances the risk of eating contaminated foods and, as a result, diarrhoea is highly prevalent. Low prevalence of diarrhoea in older children may be due to an acquired immunity from previous infections that reduces reinfections.

Socio-economic characteristics. Socio-economic characteristics of individuals and households are widely accepted as important factors explaining the variations of morbidity patterns in general and prevalence of diarrhoea in particular. In this study, ten variables representing socio-economic factors were analysed, of which seven were found to be significantly associated with diarrhoea (Table 8.2). The prevalence of diarrhoea was significantly lower for children whose mothers were literate or had secondary or higher education, whose fathers were literate, whose fathers were engaged in non-agricultural work, who lived in urban areas, whose households possessed a radio, refrigeration, or a motorcycle.

Table 8.2 : Children aged under five having diarrhoea during the two weeks prior to the survey according to selected socioeconomic characteristics, Northeast Thailand, 1987 (Percentage)

Variables	Percentage having diarrhoea No	Yes	Number of children
Mother's literacy **			
Illiterate	81	19	376
Primary & literate	87	13	230
Secondary or higher	94	6	78
Father's literacy **			
Illiterate	80	20	190
Primary & literate	84	16	357
Secondary or higher	93	7	137
Current occupation of mother ns			
Non-agriculture	82	18	54
Agriculture	85	15	219
Not working	85	15	411
Current occupation of father **			
Non-agriculture	90	10	244
Agriculture	82	18	440
Living with parents ns			
Yes	83	17	238
No	85	15	439
Urban-rural residence **			
Urban	92	8	133
Rural	83	17	551
Ownership of radio **			
Yes	88	12	436
No	79	21	248
Ownership of television set ns			
Yes	88	12	216
No	83	17	468
Ownership of refrigerator ***			
Yes	95	5	106
No	83	17	578
Ownership of motorcycle *			
Yes	89	11	162
No	83	17	522
Overall sample	85	15	684

Note: *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$, ns $P > 0.05$.
Source: Subset of the TDHS data tape, 1987. (soufin.sps)

The prevalence of diarrhoea varied significantly according to the education of the mother and father. Twenty per cent of the children of illiterate mothers or fathers had experienced diarrhoea in the two weeks before the survey. The corresponding figures were only six per cent among children of mothers with secondary or higher education and seven per cent of those of the same category of

father. Paternal education may be expected to have a negative association with childhood diarrhoea through a number of pathways. First, better education is likely to increase the opportunity to earn income, enabling the family to have better nutrition, health care, and a good home environment. Second, education provides general knowledge about health and the use of health services. Third, education may be a proxy for the unobserved health endowment of an individual, since the wealthy are more likely to be educated than the poor. However, many studies have also demonstrated a positive effect of education on morbidity, channelled through changes in consumption behaviours such as eating habits, and increased time devoted to child care. Educated people may also be more aware and have better knowledge resulting in a higher level of reporting illness than less educated people. It is therefore unlikely that bivariate analysis can be conclusive about the channels through which education of mother and father are likely to operate to affect childhood diarrhoea. This will be explored in Sections 8.2 and 8.3.

Differentials in the prevalence of diarrhoea by the current occupation of mother and father showed somewhat different. Although the largest proportion of having diarrhoea was found among children of mothers engaged in non-agricultural activities (18 per cent), this was not statistically significant. In contrast, the reported prevalence of diarrhoea was significantly lower (10 per cent) among children of fathers engaged in non-agricultural work than among those whose fathers were agricultural workers (Table 8.2). These differences may reflect differences in the substantive significance of the occupation of the mother and father, as well as possible selective under-reporting of diarrhoea. Mother's and father's occupation is partly a proxy for household wealth and income. However, the time devoted to child care by working mothers, who still hold responsibility for child care and housework in Thai society, can be postulated to have had a significant impact on child diarrhoea, because non-agricultural workers work outside the home, and thus inevitably seek a child care substitute. In the Northeast, mothers often leave their babies in the care of other adults in the same household or in others, including those

of grandmothers, friends, and neighbours. Communal eating is part of the villagers' lives, and meals are commonly shared between households. This could increase the chance of transmission of pathogenic organisms. Echeverria et al. (1985) investigated the aetiology of diarrhoea in Northeast Thailand and found that enterotoxigenic *escherichia coli* (ETEC) and shigella were the major causes of diarrhoea cases. These two pathogens were also found in the neighbours and relatives of patients with diarrhoea. Although under-reporting may occur randomly, a low level of recognition of diarrhoea may be more marked among less educated agricultural workers.

No statistically significant differences in the prevalence of diarrhoea were observed according to the type of family (extended versus nuclear families). In an extended family, alternative child care may be provided by grandparents or relatives who could be considered more experienced in child care. However, they are also more likely to adhere to traditional child care beliefs and practices. This may directly and/or indirectly influence the exposure of children to diarrhoea pathogens. Children in nuclear families may be more likely to be cared for by older siblings and to be less supervised as a result. Thus it is difficult a *priori* to identify which family type might be expected to have lower prevalence.

The reported prevalence of diarrhoea among children of rural mothers was about two times higher than those of urban mothers ($p < 0.01$). This is not surprising because most urban areas in the Northeast have better access to clean water and sanitary, sewerage disposal, and better access to health and other services than rural areas. This may diminish the chance of exposure to diarrhoea pathogens.

Household possession of a radio, television set, refrigerator, and motorcycle were interpreted to represent proxies for household wealth. Ownership of these items, except for ownership of television, were strongly associated with low prevalence of diarrhoea among children (Table 8.2).

Household water supply and sanitation. Household environment and hygiene are known to be closely linked with health. Diarrhoea is fundamentally disease that is transmitted by food-borne or water-borne pathogens. Among these pathogens, *Escherichia coli* is the most common and accounts for up to 25 per cent of all diarrhoea in developing countries, while *rotavirus* accounts for about 20 per cent of all diarrhoeal deaths in young children (Motarjemi et al., 1993: 80). These pathogens can be transmitted easily through contaminated water and foods. Imong et al. (1989) have observed that practices within households, particularly in environmentally deprived areas, may lead to a high risk of cross-contamination of faecal bacteria to utensils and cooked foods. Bacterial counts are found to be substantially higher in infant foods and supplementary water in rural Thailand. Even rain water was highly contaminated (Wirojangud et al., 1989, cited in Pinfold et al., 1991: 784). This is possibly due to an unsuitable collection and storage system, contamination, or simply dirty utensils and drinking vessels.

Prior researchers have shown the substantial effects of improved water supplies on morbidity from diarrhoea (Matulessy et al., 1982; Esrey et al., 1985; Esrey and Habicht, 1986; Mertens et al., 1990). In this study, two variables representing household hygiene were examined. The results were as expected (Table 8.3): the prevalence rates for diarrhoea were significantly higher for children whose households used well water for drinking (18 per cent) and those whose households had no toilet (20 per cent). The relative prevalence of diarrhoea associated with rain water was 12 per cent.

Table 8.3 : Children under five having diarrhoea during the two weeks prior to the survey according to household environment, Northeast Thailand, 1992 (Percentage)

Variables	Percentage having diarrhoea No	Yes	Number of children
Source of drinking water **			
Piped or tap water	92	8	92
Rain water	88	12	146
Well or others	82	18	446
Owns toilet facility **			
Yes	89	11	349
No	80	20	335
Overall sample	85	15	684

Note: ** $P < 0.01$.

Source: Subset of the TDHS data tape, 1987. (soufin.sps)

Use of health services and access to health resources. The results presented in Table 8.4 show that none of the variables describing previous use of preventive health services were significantly associated with diarrhoea prevalence at the 5 per cent level. The prevalence of diarrhoea among children was slightly higher for those whose mothers were attended by non-physicians during prenatal period, whose mothers did not receive tetanus toxoid injections during pregnancy, who did not own health record cards, and whose mothers had been assisted by traditional birth attendants in childbirth. This result is perhaps not surprising because none of the variables relating to health service utilisation examined had a direct potential impact on diarrhoea. Most children would have contracted diarrhoea through contaminated foods or water, which relate to environment and sanitation. Indirectly, the utilisation of preventive health services could be expected to improve child health. Mothers who made use of modern health services could be assumed to be more inclined to accept the modern concept of health, and to be more likely to have been exposed to modern knowledge about child care and health, resulting in better child care. Many studies have reported that general health interventions, such as a supplementary food programs, or an integrated programs on community participation and nutrition, also reduce the occurrence of diarrhoea. (See for

example, the prospective field study of health and growth in a Guatemalan village (Mata, 1978: 329) and the Narangwal project in India (Parker and Reinke, 1983: 103)).

When the type of public health services in conjunction with diarrhoea prevalence was examined, the results were inconsistent with expectations (Table 8.4). The proportions of child diarrhoea were not markedly different where hospitals were available compared with no health facility at all (11 per cent and 14 per cent respectively). The largest proportion of diarrhoea, 23 per cent, was found among children who lived in locations where there were health centres. As discussed in Chapter One, information on diarrhoea was collected by asking the mothers whether their children had had diarrhoea during 24 hours and the two weeks prior to the survey. The conventional Thai term for diarrhoea was mostly used in this survey, rather than the specialised terms used for child diarrhoea. Therefore, the answers depended on the mothers' perception regarding that term. In the Northeast, those who resided where hospitals existed were mainly urban residents. In contrast, many remote villages had no public health facilities at all. The low prevalence of diarrhoea in locations with hospitals may have been due partly to better knowledge regarding diarrhoea prevention, together with better environmental and socio-economic conditions. The low prevalence of diarrhoea reported by the mothers in locations without public health facilities may reflect under-reporting due to poorer recognition of diarrhoea.

The prevalence of diarrhoea was constant at about 11 per cent within a distance of 10 kilometres from the nearest health facility. Then, the rates increased sharply and reached the highest figure where the health centre or hospital was further than 15 kilometres away. Travel time to the nearest public health facility showed a similar relationship. Eleven per cent of children under five had contracted diarrhoea where the travel time to the nearest public health facility was 30 minutes or less. The prevalence rate of diarrhoea then increased to 22 per cent where travel took more than 60 minutes (Table 8.4).

Table 8.4 : Children aged under five having diarrhoea during the two weeks prior to the survey according to access to and use of health services, Northeast Thailand, 1987 (Percentage)

Variables	Percentage having diarrhoea No	Yes	Number of cases
Tetanus toxoid injection [ns]			
Not given	86	14	173
Given	84	16	511
Type of assistant at pregnancy [ns]			
Physician	87	13	273
Nurse/midwife	83	17	270
No one or others	84	16	141
Type of attendant at delivery [ns]			
Physician	87	13	230
Nurse/midwife	86	14	169
Traditional	82	18	285
Ownership of health card [ns]			
No card	84	16	457
Yes, seen	85	15	166
Yes, not seen	87	13	61
Type of health facility in locations [**]			
None	86	14	343
Health centre only	77	23	145
Hospital	89	11	196
Distances to nearest health facility [*]			
< 6 km to HC or HOS	88	12	204
6-10 km to HC or HOS	89	11	133
11-15 km to HC or HOS	83	17	142
> 15 km to HC or HOS	79	21	205
Time to nearest health facility [ns]			
< 11 min HC or HOS	89	11	185
11-30 min to HC or HOS	89	11	166
31-60 min to HC or HOS	81	19	194
> 60 min to HC or HOS	78	22	139
Overall sample	85	15	684

Notes: 1. [**] $P < 0.01$, [*] $P < 0.05$, [ns] $P > 005$.
2. HC = health centre, HOS = hospital, and min = minutes.

8.2 Multivariate analysis

In the previous section, bivariate relationships between diarrhoeal prevalence and several sets of the selected explanatory variables were examined. A number of variables representing demographic and socio-economic characteristics, household water supply and environment, and availability of public health services were significantly associated with the prevalence of diarrhoea. The variables describing the utilisation of preventive health services were found to be not significant. In this

section, the causal mechanisms for diarrhoeal prevalence are examined more fully by constructing a logistic model from the explanatory variables.

The final model obtained from the final stage of hierarchical logistic regression analysis contained only the variables which remained significant and the control variables. The results are shown in Table 8.5. The odds ratio, which is the relative likelihood of diarrhoea occurring for each category of a variable compared to the baseline category (odds ratio is equal to 1.0), were calculated together with the PARs. Four variables remained significant in the final logistic model after controlling for the effects of the age of the child in months and urban-rural residence. These were, in order of significance level, ownership of refrigeration, occupation of mother, type of public health facility in location, and ownership of radio.

In the final model, the variations in prevalence of diarrhoea among different age groups become stronger, particularly between the youngest (0-5 months) and the oldest (48-59 months) children. The relative likelihood of having had diarrhoea increased with age, except for the two last age groups, 24-47 and 48-59 months, for whom the prevalence of diarrhoea tended to decrease markedly. Children in the oldest age group were 0.36 times less likely to be reported as having had diarrhoea during the two weeks prior to the survey (t-statistic = - 1.97).

The effects of place of residence on diarrhoea diminished when controlled for other variables. Rural children were 2.44 times more likely to experience diarrhoea as those in urban areas, but this association was not significant at the 5 per cent level. This indicates that some non-measured variation in diarrhoea was not captured by place of residence.

There was statistically strong evidence of associations between the prevalence rates of diarrhoea during the two weeks prior to the survey and ownership of refrigerator after controlling for other variables ($p < 0.05$). The odds of children under five experiencing diarrhoea increased if the household had no refrigerator (odds ratio = 5.28). The presence of a refrigerator at home indicated not only household wealth, but probably also represented certain hygienic practices.

Those who could afford to buy refrigerators were likely to have been better off than those who could not. In addition, having a hygienic place to keep fresh foods and meat in the tropical climate of the Northeast can prevent the growth of diarrhoea pathogens.

Table 8.5 : Logistic regression parameters relating explanatory variables and prevalence of diarrhoea among children aged 0-59 months, Northeast Thailand, 1987

Variable	Estimate	SE	t-statistic	Odds ratio	PAR
Age of child in months	(LRX^2 = 26.4, 4 d.f., $p < 0.001$)				0.67
0-5	0.00	-	-	1.00	
6-11	0.41	0.49	0.83	1.50	
12-23	0.77	0.44	1.76	2.17	
24-47	-0.28	0.44	-0.64	0.75	
48-59	-1.02	0.52	-1.97	0.36	
Urban-rural residence	(LRX^2 = 11.27, 1 d.f., $p < 0.01$)				0.28
Urban	0.00	-	-	1.00	
Rural	0.89	0.49	1.81	2.44	
Ownership of refrigerator	(LRX^2 = 6.03, 1 d.f., $p < 0.02$)				0.42
Yes	0.00	-	-	1.00	
No	1.66	0.58	2.87	5.28	
Occupation of mother	(LRX^2 = 8.39, 2 d.f., $p < 0.02$)				0.83
Non-agriculture	0.00	-	-	1.00	
Agriculture	-1.50	0.50	-3.01	0.22	
Not working	-1.54	0.48	-3.22	0.22	
Type of health facility	(LRX^2 = 7.83, 2 d.f., $p < 0.02$)				0.65
Hospital	0.00	-	-	1.00	
Health centre	-0.44	0.37	-1.19	0.64	
None	0.29	0.39	0.73	1.33	
Ownership of radio	(LRX^2 = 44.66, 1 d.f., $p < 0.05$)				0.63
Yes	0.00	-	-	1.00	
No	0.50	0.23	2.16	1.64	

Notes: 1. LRX^2 and d.f. are the reductions in scale deviance and degrees of freedom when a variable is added into models.
2. SE denote standard error estimates.
3. PAR denotes Population Attributable Risk, and is calculated at each step of the analysis so that it is net of the effect of variables shown higher in the table.
4. Place of residence and age of child in month are control variables.

Source: Subset of the TDHS data tape, 1987 (soufin.sps).

Children whose mothers were engaged in agricultural work and those whose mothers were not currently working experienced lower prevalence rates of diarrhoea (relative odds of 0.22 for both categories) than those whose mothers engaged in non-agricultural work (Table 8.5). Although a significant association was observed

in the bivariate analysis; the effect was stronger in the presence of other variables. This may reflect the actual situation or higher under-reporting among those engaged in agriculture or not working. It is possible that mothers who were engaged in agricultural work, as well as those who did not work, may have had more time to care for their children. They may also have breastfed for a longer period of time than those who were non-agricultural workers.

In rural villages in the Northeast, mothers working in the fields often took their children with them. Where child care substitutes were used, they were likely to be grandparents or older siblings. Time constraints would be greater for those who worked in the formal sector, mainly in the towns. Working women in Thailand, in public services in particular, are entitled to maternity leave for a period of 90 days with pay. But those who are engaged in the informal or private sector receive pay only for 45 days. This could be one of the reasons that most women tend not take leave for the full period of time (Herunwatanapong, 1994: 102). No other options that might increase the duration of breastfeeding among working mothers, such as part-time work, nursing breaks during the day, and day care near the workplace, are yet available in Thailand. This could have a significant effect on breastfeeding and child care practices. As a result women may breastfeed their children for a short duration, or even not breastfeed at all, and bottle feeding is common. This may increase the chance of exposure to diarrhoea organisms due partly to improper cleaning of bottles, as well as the use of inappropriate kinds of breast milk substitutes, particularly sweetened condensed milk.

The type of public health facility, a variable representing the availability of health services, remained statistically significant in the multivariate analysis ($p < 0.05$). The result, however, was in the opposite direction from the bivariate analysis. Once controls for the effects of other variables were introduced, the presence of health centres had a negative effect on diarrhoea prevalence. In the bivariate analysis this category had a significant positive association with diarrhoea prevalence. Children who lived where there were no health facilities had consistently higher risk

of diarrhoea compared to those who lived in locations with health centres. One possible explanation is that the residents who lived close to health centres were more likely to have been exposed to information, including health information. Therefore, they might have been more aware of diarrhoea and to have had better knowledge about prevention than those who lived elsewhere. However, the nature of the availability of health facilities may be subject to confounding with other facilities, especially clean water supply and sanitary, sewage disposal, which are considered to be an immediate factor affecting diarrhoea.

Ownership of radio by the household had a strong negative effect on the prevalence of diarrhoea among children in the Northeast. The odds of experiencing diarrhoea for children whose households did not own a radio were 1.64 times higher than for those whose households owned a radio. This variable was consistently significantly associated with all health and nutritional outcomes investigated in this study. As noted earlier, it seems likely that radio ownership acts not only as a proxy for household economics, but also as an important means of obtaining health-related information. Although the direct relationship could not be tested as such, this result suggests that both economics and health information can play an important role in improving the health of children.

The variables describing the literacy and education of mother and water supply and household sanitation were not significantly associated with diarrhoea prevalence after controlling for the effects of other variables. This does not mean that these variables were unimportant in predicting the relative likelihood of having diarrhoea. One possible explanation of the result is that the effect of mother's education operated through other variables included in the model. This relationship will be examined in Section 8.3. As noted, water supply and household sanitation would be highly correlated with urban-rural place of residence and availability of health services because high quality water supply and better sanitation are more characteristic of urban than rural areas.

Breastfeeding practice was another variable that was not statistically significant in the final model. Previous studies have confirmed the advantage of breast milk in the health and survival of young children. It is especially important in developing countries where families are generally economically worse off, lack access to health and social services, and suffer environmental deprivation. The results of this study, however, do not mean that breastfeeding is not important in preventing children from getting diarrhoea. Breastfeeding may interact with other variables included in the model particularly age of child, to affect the risk of diarrhoeal disease.

In summary, the prevalence of child diarrhoea in the Northeast was highly influenced by community variables. Two variables (place of residence and type of public health facility in the locations) representing the community environment remained statistically significant in the multivariate analysis. This indicates the effect of differences between communities, particularly urban and rural areas. The social and physical environment in urban areas has proved effective in preventing diarrhoea. Ownership of a refrigerator or radio, and current occupation of mother also played a significant role in explaining child morbidity in the Northeast. This suggests that the complexity of childhood diarrhoea can be understood only by taking into consideration a number of factors that are interacted with the causes and consequences of diarrhoea. These include socio-economic status, hygienic practices, health education, and utilisation of health services.

8.3 Pathways through which maternal education influences child diarrhoea

The following examines the possible pathways through which maternal education operates to affect the likelihood of children having diarrhoea. The foregoing discussion has revealed that while maternal education was strongly associated with the prevalence of diarrhoea, this effect became insignificant when other variables were controlled for. This indicates that the influence of education acts through the other variables included in the model (Table 8.5). This leads to further investigate

which variables are mediating the relationships between maternal education and child diarrhoea, by fitting each variable or combination of two variables into the null model, then adding maternal education. If the effect of maternal education operated through other variables included in the model, there should be a substantial change in the corresponding coefficient estimates (or log odds), together with significant change in scaled deviance and degree of freedom. The results are presented in Table 8.6.

The gross education effect is especially important in explaining variations in child diarrhoea (change in $LRX^2 = 10.74$ and $p < 0.01$). However, the relative odds of having diarrhoea for each category of maternal education decreased markedly when the effects of other variables were controlled for. This decline was especially pronounced when the variable expressing ownership of refrigerator was added (the reduction in $LRX^2 = 2.95$ and $p > 0.10$). The attenuation due to the inclusion of ownership of refrigerator exists even when the effect of this variable was combined with other variables, such as place of residence, current occupation of mother, or type of public health facility in location. Thus, much of the gross education effect can be explained by whether or not households owned a refrigerator. It seems most likely that ownership of refrigerator acts as an indicator of household wealth, so that increased education is more likely to be associated with increased income and wealth, which directly and indirectly affect child health. Refrigerator ownership can also act as an indicator of hygienic practice. A refrigerator enables mothers or other household members to handle food more hygienically.

Place of residence was another variable likely to mediate the effect of maternal education on child diarrhoea. As a result of the inclusion of place of residence, the effect of maternal education changed from a significant ($p < 0.01$) to a not significant change in LRX^2 ($p > 0.10$). This indicates that women in urban settings had better education than those in rural areas. Thus children of more educated women tended to be less afflicted by diarrhoea than those of women with a low level of education. In addition, the education effect can be traced in the urban

settings in part through access to health facilities and factors reflecting exposure to diarrhoeal diseases.

Table 8.6 : Relative odds of diarrhoea morbidity associated with maternal education when controls for the effects of other variables are included, Northeast Thailand, 1987

Maternal education	Gross	Model 1 ur	Model 2 rad	Model 3 ref	Model 4 occ	Model 5 type
			Odds ratio			
Secondary +	1.00	1.00	1.00	1.00	1.00	1.00
Prim + lit	2.11	1.64	1.89	1.16	3.49*	1.81
Illiterate	3.40*	2.46	2.91*	1.68	5.79**	3.06*
Model LRX^2	578.8	572.1	570.8	569.8	570.7	564.9
Degree of freedom	681	680	680	680	676	678
Change in LRX^2	10.74	5.43	7.86	2.95	15.4	8.76
P-value	0.01	0.10	0.02	0.10	0.001	0.02

	Model 6 ur+rad	Model 7 ur+ref	Model 8 ur+occ	Model 9 ur+type	Model10 rad+ref
			Odds ratio		
Secondary +	1.00	1.00	1.00	1.00	1.00
Prim + lit	1.49	1.11	3.02	1.59	1.14
Illiterate	2.14	1.57	4.58**	2.60	1.61
Model LRX^2	567.2	568.8	565.3	564.9	566.0
Degree of freedom	679	679	678	678	679
Change in LRX^2	3.92	2.41	9.79	6.73	2.43
P-value	0.20	0.30	0.01	0.05	0.30

	Model 11 rad+occ	Model 12 rad+type	Model 13 ref+occ	Model 14 ref+type	Model15 occ+typ
			Odds ratio		
Secondary +	1.00	1.00	1.00	1.00	1.00
Prim + lit	3.34*	1.64	2.04	1.05	3.02
Illiterate	5.30**	2.62	2.95	1.64	5.17**
Model LRX^2	564.6	563.3	561.8	562.6	562.8
Degree of freedom	678	678	678	678	677
Change in LRX^2	12.84	6.50	5.04	3.76	12.85
P-value	0.01	0.05	0.10	0.20	0.01

Notes: 1. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
2. ur = place of residence; rad = ownership of radio; ref = ownership of refrigerator; occ = current occupation of mother; and type = type of public health facility in location.
3. Changes in LRX^2 are reductions in the scaled deviance when maternal education is added into the models.

Source: Subset of TDHS data tape, 1987 (soufin1.sps).

Maternal education acts independently of ownership of radio, current occupation of mother, and type of public health facility in location to influence child diarrhoea because the changes in LRX^2 were still large ($p < 0.02$ for ownership of radio, $p < 0.001$ for current occupation, and $p < 0.02$ for type of public health facility). The relative odds of having experienced diarrhoea among children of illiterate mothers remained significantly higher than among those of secondary or higher educated mothers.

8.4 Interrelationship between diarrhoea and malnutrition

The interaction between child nutrition and morbidity is well documented (Scrimshaw et al., 1968; Black et al., 1983: 75; Mata et al., 1983: 92; Tomkins and Watson, 1989: 13). In developing countries, diarrhoea is more common among malnourished children. On the other hand, a child with diarrhoeal disease is prone to faltering growth and is susceptible to infectious diseases (Mata et al., 1977; Rowland et al., 1977; Martorell, 1980; Delgado et al., 1983; Briend and Bari, 1989).

Once diarrhoea occurs, the nutritional status of the host is affected through a variety of mechanisms. These include reduced food consumption (vomiting, anorexia, and withdrawal of food), impaired intestinal absorption, increased nutrient loss and adverse effects of treatment on nutrition (Rosenberg et al., 1977: 1248; Martorell, 1980: 96; Mata et al., 1983: 86; Keusch and Farthivs, 1986; Tomkins and Watson, 1989: 20). The loss of appetite is sufficient to make it difficult or impossible to maintain a constant food intake during the acute phase of the illness. In addition, especially for diarrhoeal diseases, there is a strong cultural tendency in many societies to withdraw solid food and substitute liquid diets. This is sometimes reinforced by physicians who advise fasting and liquid diets for the sick child. There are other adverse effects of the treatment of diarrhoea on the nutrition of the host. For example, prolonged use of antibiotics may interfere with the intestinal flora that synthesise some essential nutrients such as vitamin K, or may interfere with intestinal absorption (Rosenberg et al., 1977: 1248; Hamilton et al., 1985: 407).

This section describes the relationship between diarrhoeal prevalence during the two weeks preceding the survey and the nutritional status of children at the time of survey. However, the cross-sectional information on diarrhoeal diseases and anthropometry obtained from the TDHS limits the analysis of the nutritional consequences of diarrhoea. The nutritional status of children with diarrhoea varies over the course of the illness depending upon the type of diarrhoea pathogens, duration, treatment, and feeding practices. Unfortunately, with the particular data set, it was very difficult to identify separately the relative importance of these various possible associations of diarrhoea and nutritional status. Previous studies based entirely on longitudinal data (see, for instance, Mata, 1978; Delgado et al., 1983) demonstrated the clear indications of growth faltering associated with infectious disease, whichever one occurs first. Nutritional status is an outcome of a complex linkage between socio-economic and environmental conditions, as well as morbidity patterns. Diarrhoea is not the only illness which commonly occurs among young children. Many studies in the Northeast have demonstrated that, although infectious diseases were the most prevalent form of morbidity among children under five years of age, the prevalence of diarrhoea markedly low compared with respiratory infections (Luangthongkham et al., 1989: 36; Schelp et al., 1990: 122).

Mean standard deviation of height-for-age, weight-for-age, and weight-for-height, and prevalence of malnutrition (the cut-off point at - 2 SD) were examined relative to the prevalence of diarrhoea. Table 8.7 presents the mean standard deviation of nutritional status for whether diarrhoea was experienced during the two weeks prior to the survey. Children who experienced diarrhoea in the two weeks before the survey have lower mean standard deviation for all the nutrition indices used than those who had not experienced diarrhoea. However, the differences were not statistically significant at the 5 per cent level.

Table 8.7 : Mean standard deviation of nutritional status of children aged 3-36 months by occurrence of diarrhoea during the two weeks preceding the survey, Northeast Thailand, 1987

Diarrhoea	Mean standard deviation of nutritional status			Number of children
	HFA [ns]	WFA [ns]	WFH [ns]	
Yes	-1.3512	-1.5131	-0.8724	78
No	-1.3199	-1.3915	-0.6925	303
Overall	-1.3263	-1.4164	-0.7294	381
Standard deviation	1.0333	1.1021	0.9679	

Notes: 1. HFA, WFA, and WFH stand for height-for-age, weight-for-age, and weight-for-height respectively.
2. [ns] refers to no statistical association at the 5 per cent level.

Source: Subset of the TDHS data tape, 1987 (sounut2.sps).

The nutritional outcomes of children in relation to diarrhoea were also examined using the prevalence of malnutrition (stunting, wasting, and underweight), as well as the Waterlow classification (combined stunting and wasting). Nutritional status was classified into five categories: standard deviation scores -3.00 SD or below (severely malnourished); -2.00 to -2.99 (moderately malnourished); -1.00 to -1.99 (mildly malnourished); -0.99 to 0.99 (normally nourished); and 1.00 or above (obese) (Table 8.8). Slightly higher proportions of severely malnourished children were found among those who experienced diarrhoea than those who did not have diarrhoea in the two weeks preceding the survey. About five per cent of children were severely stunted and nearly seven per cent were severely underweight. Except for the acute malnutrition category (weight-for-height or wasted), none of the children was found to be severely wasted. This may be due to the relatively small number of children who were classified under this index. The weight-for-age and weight-for-height indices seem to be sensitive to diarrhoea occurrence. They revealed a relatively high proportion of moderately and mildly malnourished children if the children had experienced diarrhoea in the preceding two weeks, but this was not statistically significant at the 5 per cent level.

Table 8.8 : Diarrhoea among children under five during the two-week period relative to nutritional status, Northeast Thailand, 1987 (Percentage)

Diarrhoea	Standard deviation units (Percentage)					Total	Number of children
	-3.00 or less	-2.00 to -2.99	-1.00 to -1.99	-0.99 to +0.99	+1.00 or higher		
Height-for-age ns							
No diarrhoea	3.6	22.8	38.0	32.3	3.3	100	303
Had diarrhoea	5.1	16.7	37.2	39.7	1.3	100	78
Weight-for-age ns							
No diarrhoea	5.6	25.7	35.6	30.7	2.4	100	303
Had diarrhoea	6.4	28.2	37.2	25.6	2.6	100	78
Weight-for-height ns							
No diarrhoea	0.3	3.6	37.6	53.8	4.6	100	303
Had diarrhoea	0.0	9.0	43.6	42.2	5.1	100	78

Note: ns stands for not statistically significant at the 5 per cent level.

A similar relationship was found for the Waterlow classification index (Table 8.9). Thus, the anthropometric data, particularly the weight of children, which as officially recorded in Thailand, are useful to some extent for health intervention and policy. They indicate possible areas of priority in terms of the groups of children who should be given more attention on matters related to nutrition and diarrhoea.

Table 8.9 : Children who experienced diarrhoea in the two weeks prior to the survey by the Waterlow Classification, Northeast Thailand, 1987 (Percentage)

Diarrhoea	Waterlow classification (Percentage)				Total
	Stunted & wasted	Wasted only	Stunted only	Normal	
Yes	3.8	5.1	17.9	73.1	100.0
No	2.0	2.0	24.4	71.6	100.0
Overall	2.4	2.6	23.1	71.9	100.0
Total number of children	9	10	88	274	381

Notes: 1. The relationship was not significant at the 5 per cent level.
2. Wasted represents children whose SD of weight-for-age falls -2 SD or below and whose height-for-age is above -2 SD.
3. Stunted represents children whose SD of weight-for-age falls above -2 SD and whose height-for-age is -2 SD or below.
4. Stunted and wasted represents those whose weight-for-age and height-for-age scores fall -2 SD or below.

8.5 Treatment of child diarrhoea

This section explores the treatment of diarrhoea, including the use of ORS, as well as the factors which underlie whether or not such treatments were given. Prompt treatment and appropriate management of diarrhoea are critical to health and nutrition outcomes, as well as to the survival of a sick child. A significant development in recent years has been the discovery that dehydration from acute diarrhoea can be prevented and cured by the simple method of oral rehydration therapy (ORT), using either pre-packed oral rehydration salts (ORS) or a home-made solution (Rahaman, 1985: 69; Grant, 1986: 90). In Thailand, ORS produced by the government pharmaceutical organisation was made available nationwide as part of the National Control of Diarrhoea Diseases Program in 1978 (Vorakitphokatorn, 1985: 11; Varavithya and Ramaboot, 1986: 46). Despite the effectiveness and inexpensiveness of ORT, like other health services, the use of ORS varies from place to place and the level of use is low.

The analysis was confined to 104 children aged 0-59 months who had experienced diarrhoea during the two weeks immediately prior to the survey. Five questions were asked in relation to the treatment of diarrhoea in the TDHS. These were: 'Did you take (name) to a private doctor or to a hospital or clinic to treat the diarrhoea? If yes, whereabouts? Was (name) given an oral rehydration packet to treat the last episode of diarrhoea? and Was there anything (else) you or somebody did to treat the diarrhoea? If yes, what was done?' From the above information, three variables representing treatment of diarrhoea were constructed. These include type of health facility visited, type of medication the children received, and oral rehydration.

Table 8.10 presents the type of health facility where treatment for children with diarrhoea was sought by selected variables. The type of health facility was broadly classified into three categories: hospital or clinic, health centre, and none. Neither private as against government health services nor modern as against traditional health services could be identified because of lack of information. In

general, more than half of children who had diarrhoea were not taken to any health facility. The rest received treatment either from hospitals and clinics (25 per cent) or health centres (20 per cent). In relation to the selected characteristics of the children, the sex of the child was weakly associated with the type of health facility the children were taken to. Place of residence showed a strong relationship with the type of health facility used ($p < 0.001$). Only one in five of the urban children who had diarrhoea was not treated, while the corresponding figure for the rural children was three in five. However, this result should be interpreted cautiously because of the relatively small sample of urban children. Maternal education had a positive effect on the use of a health facility for child treatment ($p < 0.05$). Use of health care facilities was significantly higher (41 per cent for hospitals and 24 per cent for health centres) among children of secondary or higher educated mothers. Only 20 per cent of children of illiterate mothers used any health facility. Children tended to be taken to a health facility if their births had been attended by modern trained health personnel, but this result was not statistically significant.

Table 8.10: Type of health facility visited for treatment of childhood diarrhoea in the two weeks preceding the survey by selected variables, Northeast Thailand, 1987 (Percentage)

Variable	Percentage of children			Number of children
	None	Hospital[a]	Health centre	
Sex of child [ns]				
Boy	54	24	22	59
Girl	56	27	18	45
Place of residence [***]				
Urban	20	20	60	10
Rural	59	26	16	94
Ownership of radio [ns]				
No	56	28	16	50
Yes	54	22	24	54
Education of mother [*]				
Secondary or higher	35	41	24	34
Primary and literate	59	20	22	51
Illiterate	79	11	11	19
Type of attendant at birth [ns]				
Health professional	50	21	29	52
Traditional midwife	60	29	12	52
Total	55	25	20	104

Notes: 1. [a] Includes private clinics.
2. [***] $p < 0.001$, [*] $p < 0.05$, [ns] $p > 0.05$.

With respect to the use of pharmaceutical medications, a single variable was constructed by combining the type of health facility and the dichotomous answer to a question as to whether the child was given medicine (excluding oral rehydration solution). The variable was then classified into three categories: received no medicine at all, self-medication, and prescribed medicine. The results are shown in Table 8.11. Thirty-nine per cent of children were reported to have received no medicine at all during the last episode of diarrhoea, while the comparable figures were 29 per cent for self-medication and 32 per cent for prescribed medicine. Place of residence and education of mother were significantly associated with the type of medication. Self-medication appeared to be common among rural residents (32 per cent), but none of the urban children fell in this category. Children whose mothers had received secondary or higher education were less likely to buy drugs for treatment (12 per cent) than the semi-literate (39 per cent) or illiterate (32 per cent).

Table 8.11 : Type of medication children received for treatment of diarrhoea by selected variables, Northeast Thailand, 1987

Variables	Percentage of children			Number of Children
	None	Self-medication	Prescribed[a]	
Sex of child [ns]				
Boy	41	31	29	59
Girl	38	27	36	45
Place of residence [*]				
Urban	40	0	60.0	10
Rural	39	32	29	94
Ownership of radio [ns]				
No	44	26	30	50
Yes	35	32	33	54
Education of mother [**]				
Secondary or higher	41	12	47	34
Primary and literate	31	39	29	51
Illiterate	58	32	11	19
Type of birth attendant [ns]				
Health professional	33	29	38	52
Traditional midwife	46	29	25	52
Total	39	29	32	104

Notes: 1. [a] Includes medicine prescribed by a qualified health professional, both public and private sectors.
2. [**] $p < 0.01$, [*] $p < 0.05$, [ns] $p > 0.05$.

Source: Subset of the TDHS data tape, 1987 (file: soutreat.sps).

The results on the use of oral rehydration solution (ORS) including homemade solutions are shown in Table 8.12. Slightly less than half of the children were given ORS during the last episode of diarrhoea. Children were more likely to receive ORS if they were residing in rural areas, had mothers with secondary or higher education, had mothers who were engaged in agricultural work, or if the child's birth had been attended by a traditional birth attendant. Education of mother, however, was the only variable that was significantly associated with ORS usage ($p < 0.05$).

Table 8.12 : Children who had diarrhoea in the two weeks preceding the survey by receipt of oral rehydration solution (ORS) and selected variables, Northeast Thailand, 1987 (Percentage)

Variable	Given ORS (percentage) Yes [a]	No	Number of children
Sex of child [ns]			
Boy	46	54	59
Girl	44	56	49
Place of residence [ns]			
Urban	30	70	10
Rural	47	53	94
Ownership of radio [ns]			
No	39	61	38
Yes	48	52	66
Education of mother [*]			
Secondary or higher	62	38	34
Primary and literate	47	53	51
Illiterate	11	89	19
Type of birth attendant [ns]			
Health professional	38	62	52
Traditional midwife	52	48	52
Total	45	55	104

Notes: 1. [a] Includes commercial ORS and homemade ORS.
2. [*] $p < 0.05$, [ns] $p > 0.05$.

Source: Subset of the TDHS data tape, 1987 (soutreat.sps).

In summary, childhood diarrhoea was not commonly treated by modern health professional in the Northeast. Only 45 per cent of children had consulted a health professional. Although there was a relatively low proportion of health professional consultation, the use of medication was high, as 61 per cent receiving medicine. Only 32 per cent of the medications were prescribed, while about the

same proportion of children were given non-prescribed medicine. The widespread practice of self-medication in the Northeast could possibly be explained by the ready availability of modern pharmaceuticals and perceived superiority of such medicine, as previously discussed in Chapter Five. The results also reveal the unpopularity of ORS in the Northeast, as less than half of the children who suffered from diarrhoea were given ORS. Studies elsewhere in Thailand have also reported relatively low level of use of ORS (Varavithya and Ramaboot, 1986: 47; Chusataporn et al., 1990: 361; Thongkrajai et al., 1992: 92). However, few studies have so far assessed the underlying reasons for the use or non-use of ORS. Given the limited information on ORS obtained from the TDHS, it was impossible to explore the reasons behind the low use of ORS from that data set. Therefore, understanding of this aspect was sought using the field work data.

8.6 Treatment of child illness: data from the case study village

This section explores the morbidity patterns and treatment among children aged under five from a cross-sectional survey in the case study village, together with the case profiles of some children who were sick during the three-month period of fieldwork in 1992. The questions concerning morbidity asked in this fieldwork were slightly different from those used in the TDHS (see Appendix B). The fieldwork covered not only diarrhoea, but also other illnesses and/or symptoms afflicting children during the two weeks before the survey. In addition, indepth interviews and observations were carried out for children under five who were reported as having been ill during the time of the fieldwork. Of these 77 children under five, nearly half (35 children) were reported to have been ill in the two-week reference period before the survey (Table 8.13). Fever alone or combined symptoms including fever accounted for most of the illnesses afflicting children in the case study village (11 children had fever only and 14 children had combined fever with a cough or vomiting). Five children were reported as having had a cold. The high morbidity of ill-defined infections is comparable to that from the TDHS discussed in Chapter Four.

Surprisingly, diarrhoea was reported as having occurred only among three children during the period. They were aged 15 days, 9 and 11 months, and all were boys. Despite using the local term for diarrhoea in the interviews, the reported prevalence of diarrhoea was very low in the case study village (four per cent), compared to 15 per cent for the Northeast as a whole. This could be due to a number of factors. First, although the surveys were commenced in the same month of the year (March), the TDHS survey lasted until June 1992. This period covered the hot, dry period leading to the beginning of the wet season in the Northeast. Prior studies in Northeast Thailand have demonstrated that acute diarrhoea caused by bacterial infections is much more pronounced at that time especially for children aged two years or older and adults (Pinfold et al., 1991: 778). For young children (0-2 years), rotavirus is the major cause of acute diarrhoea, with a peak during the cool-dry season (Echeverria et al., 1985; Thongkrajai et al., 1986; Pinfold et al., 1991: 778).

Second, improvement in socioeconomic and environmental conditions is likely to have taken place during the six years between the TDHS survey and the period of the field work. This change could have had corresponding 'spillover' effects on the health and the standard of living of the people. Third, the age distribution of the children differs between the two samples, the case study village children being younger than those the TDHS sample. Almost 15 per cent of the village children were aged 0-5 months, while the comparable figure for the TDHS was eight per cent. As discussed previously, marked variations in diarrhoea were observed across age groups. In addition, children during the first few months of life in rural areas, as well as in the case study village, were more likely to be breast-fed. In the case study village, all children were breastfed and breastfeeding continued for at least a year. Thus the immune property of breast milk might have protected the children from contracting diarrhoea. Finally, the low prevalence of diarrhoea in the case study village may reflect variations in diarrhoeal morbidity in different geographic settings. In terms of personal hygiene in the case study village, babies

received much attention from parents, as well as other family members. They were bathed at least 2-3 times per day. Although the villagers faced a shortage of water during the hot and dry season, they still managed to maintain their standards of personal hygiene.

Other studies in the Northeast suggest that the case study findings are not atypical. Although differing in methods of study, a longitudinal study conducted in relatively prosperous villages in Khonkaen province between June 1982 and June 1985 found similar morbidity patterns among children under five. Ill-defined infections, particularly fever and cough, accounted for most illness episodes (80 per cent) compared to only five per cent due to diarrhoea. This may be partially due to the protective effects of breastfeeding, since almost all children were breast-fed. Personal hygiene was also generally good (Schelp et al., 1990: 122).

Table 8.13: Morbidity of children under five during the two weeks preceding the survey, Ban Tha, 1992

Illness or symptom	Percentage	Number
Reported	46	35
Diarrhoea	4	3
Fever only	14	11
Fever and cough	17	13
Cold (cough and running nose)	6	5
Chicken pox	1	1
Vomiting and fever	1	1
Conjunctivitis	1	1
Not reported	55	42
Total	100	77

Source: Field research, case study village, 1992 (file, sala.sps).

As suggested by the TDHS analysis, although morbidity was high, some cases of illness were not treated. Ill-defined infectious diseases, particularly respiratory infections, were very prevalent among young children in the study village. However, many villagers considered that respiratory infection was not a severe illness and the children were often left untreated. Treatment would be sought only for illnesses such as pneumonia or if the illness (particularly fever), persisted

longer than two to three days. A 28-year-old mother who had received six years of formal education from the village primary school described her daughter's illness in the following way:

> My daughter, she has a common cold. She is fine during the day, except for a little cough and running nose. She sleeps well at night. Although she has been sick for a week, this does not bother me much as long as she can eat. She has a cold quite often, almost every month I think.

The villagers believed that changing weather, especially exposure to cold weather, was the major cause of respiratory infections. Personal contact with ill persons who were coughing and sneezing was also mentioned as a cause.

Cultural beliefs partially explained the low levels of treatment for certain childhood illness. Although the prevalence of diarrhoea was surprisingly low at the time of the survey, the qualitative results suggested that diarrhoea was common during infancy. All seven women aged 17-26 years and eight women aged 40-72 years in the focus groups mentioned that all children experienced *sou* (literally overripe, the local term for infantile diarrhoea) when they were young. The villagers believed that *sou* is associated with a normal development stage of infancy. Such bodily changes as when the child learns to hold up its head or turn over, teething, and crawling until the time it can walk were believed to be accompanied by *sou*. A 26-year-old mother who had received six years of education said:

> *Sou* occurs in all children no matter how healthy they are. It is not illness but part of bodily changes in children. My youngest son aged eleven months has experienced *sou* twice since he was born. The first time was when he was about to hold up his head and now that he is learning to walk he has *sou* again.

Apart from *sou* or natural bodily changes, villagers believed that a number of things caused diarrhoea in children, including eating the wrong food, or contaminated food or water, the climate and during hot breast milk. The first was considered a particularly common cause of diarrhoea among children aged two years or older, and adults. 'Wrong' foods included leftover food, sour fruit, pickled vegetables, oily food, and water-melon.

It was believed that diarrhoea can pass through breast milk from an infected mother to affect the child, particularly during the crucial postpartum period when

mothers are supposed to strictly observe food and other restrictions. If the mothers had diarrhoea, they had to stop breastfeeding until the diarrhoea disappeared and/or stop eating the foods which were believed to have caused the diarrhoea. (Postpartum food restrictions have already been discussed in Chapter Seven.) Feeding children with hot breast milk, such as immediately after the mother had been working in the field or was exposed to the sun, was believed to cause diarrhoea in children. Mothers were advised to take a bath or take a rest until the breast milk cooled down. (This belief has also been observed in other villages in the Northeast, Thongkrajai et al., 1988; Vong-Ek, 1990.)

Feeding practices during illness

Apart from the pathological progress of the illness, feeding patterns during the course of illness directly affects health and nutrition outcomes. Perceptions about the causes and severity of illness influenced the management and treatment of illness. This section describes feeding practices and the treatment of common illness afflicting children in the case study village, incorporating both survey and qualitative data.

Breastfeeding was continued during the course of illness for all reported ill children who were breastfed (Table 8.14). However, indepth interviews suggested that the mothers were likely to withhold breastfeeding if they believed that the illness, particularly diarrhoea caused by eating wrong foods, would pass through the breast milk as discussed above. Nearly half of the children (48 per cent) continued to eat weaning foods during illness, although less often than usual. Only one child was reported to refuse feeding. Ordinary food, especially solid food, was often not taken by sick children, and there was a tendency to replace solids with semi-solid food, such as rice porridge with salt or other soft food during the course of illness. Weaning foods were not eaten by sick children mainly because the children refused to eat rather than because of withholding by the caregiver.

Choices of child treatment

The case study revealed a range of responses to child health. Table 8.14 indicates that the majority of the children reported ill in the case study survey (26 children) were treated in one way or another, while nine were not treated. All nine children who were not treated were suffering from diarrhoea (two children) or respiratory infections (seven children), which many villagers viewed as common and not severe. Most sick children were treated at the health centre. Private clinics, drug stores, and home remedies were among the alternative treatments available inside and outside the village. As discussed in Chapter Five, the health centre was not fully utilised for preventive health services such as prenatal care and childbirth, but was heavily used for curative care.

Table 8.14 : Household management and treatment of the last episode of common illness in the two weeks prior to the survey, Ban Tha, 1992

Management and treatment	Percentage	Number
Breastfeeding		
As often as usual	38	13
Stopped breastfeeding	62	21
Weaning practices		
As often as usual	37	13
More often	11	4
Less often	49	17
Not at all (child refused)	3	1
Drinking		
As often as usual	60	21
More often	9	3
Less often	31	11
The mothers had heard about ORS		
Yes	94	33
No	6	2
Type of treatment		
Health centre	45	16
Hospitals	6	2
Private clinic	11	4
Drug store	6	2
Home remedy	6	2
Not treated at all	26	9
Total	100	35

Note: Only one child who had diarrhoea received ORS.

Source: Field research from the case study village, 1992 (file, sala.sps).

A child who passed loose stools two to three times per day for less than three days was not considered by the mothers to be severely ill and needed no treatment. Breastfeeding was continued and no special management was thought to be required. However, if diarrhoea persisted for two to three days or more in conjunction with symptoms such as fever, vomiting, and weakness, treatment was sought. In that case, modern medicine was preferred, either prescribed from hospitals, health centres and private clinics, or purchased from drug stores or groceries. Although home remedies such as use of guava leaves, tea leaves, or the bark of a native tree (*kae*) was mentioned, this was not common. A 45-year-old mother who had completed four years of schooling explained:

> When my grandson, four years old, had diarrhoea last year, I gave him boiled water with guava leaves. The diarrhoea disappeared the following day. However, this home remedy may not be appropriate for other children. I remember that when one of my neighbour's children had diarrhoea a couple of years ago. Her parents gave her boiled water with guava leaves, but the diarrhoea persisted for several days. She was eventually taken to the hospital.

ORS was rarely used for the treatment of diarrhoea, partly because villagers had little knowledge about it. Among the three children who had diarrhoea at the time of the survey, only one, a 9-month-old boy, was treated and given ORS. Bua, the 27-year-old mother of the boy, told me that she had heard about ORS from the health workers and saw a poster at the health centre. However, she had never used ORS before. She used it only after her son had loose stools the previous month. At that time she had taken him to the health centre; she was given ORS together with two bottles of medicine. She then gave him ORS and the medicine according to the health worker's advice and continued until the diarrhoea subsided. The other two children went untreated and did not receive ORS. In the village, ORS was not available in the village shops, and was therefore not given unless the children were taken to the health centre, where an ORS packet was prescribed. Home-made ORS could be one of the best alternatives for rehydration management, since rice is culturally acceptable and the shift to semi-solid foods and rice porridge was an established practice in the village. However, health workers would need to inform mothers of its value.

Health seeking behaviour among the villagers varied among individuals and households. A wide range of sources of treatment was sought during sickness, including the health centre, district hospitals, provincial hospital, private clinics and self-medication, and no treatment at all. The qualitative study revealed that many parents did not take their children to the health centre during illnesses for various reasons. Low quality of care, ineffectiveness of the medicines obtained from the health centre, and the influence of parents or older relatives were repeatedly mentioned. The following case profiles demonstrate the villagers' experiences in utilising the services of the health centre for children's illnesses.

Bang's family (Mrs Bang, aged 26 years, had completed six years of schooling). In April 1990, Mrs Bang sought help from the health centre because her eleven-month-old daughter had high fever with restlessness. She first visited the health centre and received three bottles of prescribed syrup (one for fever, one for cold, and the other for anti-inflammation). Nearly two days after the first treatment the condition of her daughter had not improved, but had deteriorated. The child had high fever, and was restless, short of breath and coughed the whole night. Her neighbours suggested she take the child to a medical doctor in town who was said to excel in the treatment of childhood diseases. According to their neighbours, the doctor was proficient and prescribed effective medicines. Bang and her husband decided to take their youngest daughter to *Maw Dek* Clinic, the private clinic from which this doctor operated. The doctor told them that their child suffered from *rok pod buam* (pneumonia), which could be fatal in children. He prescribed two bottles of syrup and one injection for a cost of 60 *baht*. The child eventually recovered, but later contracted another two episodes of pneumonia at the ages of one-and-a-half years and two years. After that, whenever her children became ill, Mrs Bang immediately took them to the same clinic. She said that, although her family was relatively poor, she was willing to pay, whatever was necessary to have her child properly treated and completely recovered. She said that the health workers were able to treat only simple illness, but most childhood illness were severe and required

prompt treatment with effective medicines. These were beyond the expertise of the local health workers.

Family and neighbours were influential in helping Mrs Bang decide where her child should be treated. Most villagers tended to follow the advice or suggestions given by their relatives or neighbours about treatment for illness. As Mrs Bang said:

> I have to conform to whatever my relatives advise me to do and where to go regarding treatment for my daughter. They have experienced such health problems and are satisfied with the treatment they were given. If I do not follow their advice and something happens later on, I cannot expect help from them any more.

Somsri's family (Somsri, aged 26 with six years of schooling). Somsri was the mother of two sons aged four months and four years. Her family was among the well-off in the village, as they had several small businesses, including a village shop and a construction business, and owned cultivated land. Her youngest son had suffered from two episodes of respiratory infection and one episode of diarrhoea. He contracted diarrhoea when he was three months old. She took him to the health centre about 100 metres from her house where the health worker prescribed two bottles of syrup (white and pink in colour). The diarrhoea persisted after two days of taking the medicines, so she decided to take her son to the *Maw Dek Clinic* private clinic specialising in childhood diseases. (She also had heard other villagers mention the proficient doctor there and his highly effective medicines.) The doctor prescribed two bottles of syrup of the same colours as those purchased from the health centre, and her son recovered the following day. She believed that the medicines from the health centre were not as effective as those from the private clinic. She also thought that the syrup obtained from the health centre was not good for very young children. She said:

> I think the quality of drugs obtained from different places is different. Of course, a clinic or hospital has better quality drugs than the health centre. But, I also suspect that different people may react differently to the same medicine. For example, my eldest son received treatment from the health centre and completely recovered from fever, while my youngest son did not.

Tim's family (Tim was a 27-year-old who had received six years of schooling). Tim's family was relatively poor by village standards. All the family members (her mother, her husband and herself) were engaged in subsistence agriculture and casual labour during the slack season. They grew sticky rice for household consumption only, and cassava as a source of cash income. Her husband also sought casual work in the village for additional income. Tim related how she had sought treatment from the health centre when her oldest son was sick three years previously. When he had difficulty in breathing at night, she immediately took him to the health centre. The health worker prescribed two bottles of syrup at a cost of 40 *baht*. Two days after taking this medicine, his condition had not improved. Tim and her husband decided to take him to the hospital in the town. The doctor told them that their son had contracted pneumonia, which required hospitalisation for a couple of days. She stayed with her son in hospital and her husband returned to the village, although he visited them regularly. The condition of her son improved markedly within one week of hospitalisation and they returned home the following week. After that episode, they had never again visited the health centre for curative care for their children. When Tim's youngest son aged 11 months had fever and diarrhoea during my stay, she bought medicines from the village store next-door for treatment. However, she did use the health centre for immunisation and contraception. She considered the medicine she received from the health workers to be less effective and more expensive than that from the village store. The higher cost of the medicines obtained from the health centre compared with the village store discouraged Tim from seeking treatment for her children from the health centre when she considered an illness to be not serious.

Home-medication. The case study found that self-medication which was not reported in the TDHS, was an important form of treatment for child illness. As discussed in Chapter Three, medicines were widely available in the village and elsewhere in Thailand. Modern pharmaceuticals were well accepted in the case study village for their effectiveness and potency. Injections were believed to have

superior curative properties and potency to other drug preparations. The villagers were ill-informed about drug use and side effects. Drugs were freely advertised in drug-stores and clinics and through all types of media, including television, radio, and publications. The following sub-section discusses the distribution and use of drugs, particularly home-medication, in the village using information derived from case studies.

Over-consumption and the misuse of drugs, particularly antibiotics, were widespread in the village. The easy availability and acceptability of modern pharmaceuticals among the villagers were partly responsible for overuse and misuse. Commercial pharmaceuticals were widely promoted and available in the drug-stores and even in village groceries. Eleven village stores in the case study village sold both brand name and generic drugs purchased from pharmacies or drug-stores in towns (see Chapter Four, Table 4.13). Only the *yaa chud* and *yaa maw neud* were regularly delivered by drug vendors.

The villagers were not aware of the adverse effects of medicines, and information on expiry dates was not provided. Doctors in the hospitals and clinics often removed the labels from prescribed drugs before giving them to patients. Antibiotics, analgesics, vitamins, and steroids were widely available in the village, and all were both overused and misused. There was little effort by health personnel to educate the villagers about health and drug problems. Thus, misconceptions about drug use was often passed from one villager to another. The villagers tended to consult each other regarding treatment and drug use. Once they were satisfied with the outcome of a certain drug, they tended to disseminate their experience to others, as shown in the following case study.

Tim's family. In April 1992, Tim's middle and youngest sons had *pen kai* (high fever) and *jep lin* (sore tongue). Although her sons frequently suffered from these illnesses, she considered them to be not serious and easily treated by medicines bought from the village stores. Phut owned the store next to Tim's house selling a variety of modern medicines, both oral and injected drugs. Tim bought drugs from

Phut's store when her children or other family members fell sick. On this occasion, she bought two packets of the brand names *yaa song kae kai* (anti-pyrexia powder), *hua sigha* and *vikul*. Not knowing that each of these medicines was for fever, she used them together. She gave both medicines to the children on the first day of illness. She explained that Phut always advised her regarding drug use and treatment, and her neighbours also used these medicines for their children. According to Tim, this combination of medicines for fever in children resulted in their quick recovery. She also considered the price of these medicines reasonable. The three medicines together cost only 20 *baht* (A$ 1 = 18 *baht*). Similar medicines from the health centre were much more expensive.

Boonmee's family. Boonmee (aged 39 years) was married with three children, the eldest a son aged nine years and two daughters aged three and six years. Both he and his wife (Somrose, aged 36 years) had completed four years of schooling. They had lived in a house with Somrose's parents after they married about ten years ago, but her parents had passed away three years ago. Although Boonmee's family owned about twelve *rai* of rice paddy and 20 *rai* of cassava farm, the family was relatively poor. He worked as a vendor selling traditional fabric and mattresses during the off-farm season (December to May) every year. While he was away from home, all domestic and farm work was carried out by his wife. Boonmee and his wife realised that their youngest daughter was not healthy. She had contracted *rok pod bueam* (pneumonia) twice since she was born, and was skinny and less active than other children of her age. Boonmee said that his daughter now had *sang*, which often occurred in young children. His eldest and middle children also experienced *sang* when they were between two and four years of age. His daughter could hardly eat (*sang mai kid kao*), but liked eating sweets. Boonmee bought a bottle of medicine called *sul-bco* (the brand name of an anti-biotic containing sulfonamide), which was recommended by his neighbour. He did not know that this was an antibiotic that needed to be taken under supervision for a specified period of treatment. His daughter was given the medicine irregularly and,

when I visited, had finished two bottles. He discovered that the medicine was also very effective for treating certain skin diseases, as well as sexually transmitted diseases (STD). The efficacy of a combination of *sul-bco* with *heromysin* (a brand name of antibiotics containing tetracycline), was well-known among vendors. When his eldest son had an abscess behind his right ear, Mr Boonmee also gave him a combination of these medicines.

An injection was regarded as more efficient and potent than other forms of medicine such as pills and capsules, particularly among adults. The local health personnel contended that villagers always asked for injections, whatever their health problem or disease. For instance, an internal injury caused by an accident could be treated by an injection of *yaa kae cham nai* (medicine for an internal bruise). In fact, no such medicine was directly recommended for treatment for an internal injury, although pain relief and tetanus toxoid could be given. While I was in the village, two men suffered accidental falls and one women had a motorcycle accident. All were treated by both traditional healers and the local health workers. The traditional healer applied coconut oil to the infected areas and chanted Pali holy words before performing *yang fai* (roasting). The local health worker was also consulted in order to give injections of *yaa kae cham nai.*

Injections were also popular among post-partum women. During my stay in the village, two post-partum women from the village and another two from neighbouring villages consulted the health workers for injections of *yaa bam rung laud* (nourishing the blood) and *yaa kae kin pid* (prevention for eating wrong food). One woman was given an injection by her father who was a former sub-district doctor and currently a drug vendor selling both modern medicines, including injections, and herbal medicine. The villagers believed that post-partum women needed injections as a prophylactic to prevent them from eating the wrong food and avoiding other undesirable complications, and to nourish and strengthen their bodies. The latter was especially important since most of the villagers, including the women, were farmers.

Although shop owners were not qualified pharmacists, they also gave advice based on their own experiences as well as information acquired from others. For example, a shop owner would suggest the brand name drugs available from their shops that should be used to treat a common cold. Often the villagers came to buy a certain brand name of medicine, but did not know how much of the drug should be taken. The shop owner rarely consulted instructions, and in most cases the medicines were sold without labels. I observed the following interaction between a shop keeper and a customer:

> Customer: 'Could I have penicillin?'
> Shop owner: 'Oh, what did you want it for?'
> Customer: 'For my father, he has fever.'
> Shop owner: 'How many capsules do you want?'
> Customer: 'Two capsules.'

I made several observations at one store located on the main road in the village. I found that many farmers stopped by the store almost every morning to purchase *yaa song* (a packet of analgesic). They took the medicines with them to their farms to use while working. Similarly in the evening on the way back home, a few again bought *yaa chud* or *yaa maw naed* for evening consumption. The shop owner said that *yaa song* was one of the best selling drugs in the village because many villagers, particularly those who were engaged in physical work, needed them. Some villagers were apparently addicted to *yaa song*. The villagers said that they needed this drug, otherwise they could not work productively.

Despite the prevalence of misconceptions and lack of knowledge about drugs and drugs use among the villagers, I saw no evidence of local health workers trying to educate people on these matters. Indeed, drug misuse and overuse was not only seen among the patients of unqualified or untrained health providers. It was also evident among the patients of qualified health personnel, particularly in private clinics. A number of villagers received injections for pain or weakness from private clinics in towns.

8.7 Summary

The TDHS analysis reveals that diarrhoea was very prevalent in the Northeast, where the environment and culture are distinct from the rest of Thailand. The population is predominantly poor, with low levels of education and most are employed in agriculture or as informal labourers. They make little use of preventive health care. In this context, socio-economic and environmental conditions, health information, occupation of the mother, and utilisation of health services were among the most important variables explaining the variations in the reported prevalence of diarrhoea. In contrast to the TDHS figures, diarrhoea morbidity in the case study village was surprisingly low. The information collected on morbidity in the case study covered a broader ranges of illness among children than the TDHS. This case study found that other infectious diseases, such as fever and cough, were most prevalent. These morbidity patterns were similar to prior studies conducted in rural communities in the Northeast.

Although diarrhoea affected young children, the illness was not always treated or managed in medically appropriate ways. Unless the conditions worsened and diarrhoea was accompanied by other symptoms, many children went untreated. Diarrhoea was believed to be part of the normal process of bodily change or *sou*. For those who were treated, however, non-prescribed medicine or self-medication was likely to be used. The case studies indicated that medicine was frequently misuse even for young children. The villagers maintained their traditional approaches to child feeding, particularly supplementary and weaning practices. In many respects, these contributed to the contamination of food and water consumed in the home and community. Public health interventions have emphasised provision of clean water supply and sanitation, mainly in urban areas. Although there are regarded as effective means to reduce the prevalence of diarrhoea, they have yet to be fully implemented in the Northeast.

Community level factors also proved to be powerful predictors of the health outcomes of children. Children who had easy access to public health facilities had a

better health outcome. This can in part be explained by the use of health services. The case study has confirmed that the health centre was widely used by the villagers for curative rather than preventive purposes. However, paradoxically, utilisation of health services and contact with health facilities may increase the chances of obtaining preventive health information concerning maternal and child health, both directly and indirectly, from health education programs. Community health facilities which have recently been expanded to provide health services throughout the country should be reoriented and targeted to serve the health needs of the population under their jurisdiction. The community health workers should be equipped with a broader range of knowledge including technical and socio-cultural aspects of the community, and with sufficient facilities to enable them to provide efficient and effective health care services.

CHAPTER NINE

Conclusions and implications

Thailand has reached the stage of the health transition where fertility approaches replacement level, infant mortality and life expectancy have improved markedly, and the causes of mortality and morbidity are changing from infectious and parasitic diseases to chronic and degenerative diseases (Kachondham and Chunharas, 1993: 208). Despite the impressive improvement in overall health status in the country, the health of vulnerable groups, young children in particular, remains afflicted by preventable diseases, with malnutrition and infectious diseases still prevalent in many rural areas. Marked regional differentials in health also persist. The health of the population in the Northeast, the region with the lowest income and home to one-third of the country's population, is poor. The persistently high prevalence of malnutrition and infections in the Northeast is believed to arise from multiple causes encompassing cultural, socio-economic, and environmental conditions. To fully understand such complex health problems, all these conditions need to be considered. This study examined the patterns and correlates of the utilisation of health services and child health in the Northeast, using a combination of quantitative and qualitative data and methods. The TDHS and field research were the prime sources of data used throughout the study. A modification of the malnutrition-infection syndrome model developed by van Norren and van Vianen (1986) was used as the conceptual framework for the study, and logistic regression was used to identify the predictive power of the explanatory variables.

This chapter presents a synthesis of the health and nutrition problems faced by the Northeast, based on the results of the study, and suggests policy recommendations and further research. It is divided into three sections. Section 9.1 presents the main findings of the study based on the TDHS and the field research. Section 9.2 discusses the importance of combining quantitative and qualitative approaches. Section 9.3 discusses the implications of the results, makes policy

recommendations and suggests future research relevant to improving the health and nutrition of the population, particularly the vulnerable groups in rural areas.

9.1 Summary of findings

This section highlights the main findings on the utilisation of health services and child health based on the TDHS and the field research.

Utilisation of preventive health services. Four indicators of utilisation of health services (prenatal care, tetanus toxoid injection, choice of assistant at childbirth, and ownership of health record cards) were examined in this study. The analysis presented in Chapter Four, Section 4.5, indicates that utilisation of preventive health services by women in the Northeast was relatively low. Twenty-two per cent of pregnant women did not receive prenatal care, 26 per cent were not given tetanus toxoid injections, 43 per cent of childbirths were assisted by health providers without modern training, and 67 per cent of children had no health cards (Table 4.10).

However, the level of service provision was quite high. In 1987, almost all sub-districts (98 per cent) had a health centre (NESDB, 1989: 22). The average distance to the nearest health centre in the Northeast was 3 kilometres and the average distance to the nearest hospital was 13 kilometres (Table 3.8). Despite the impressive expansion of government rural health facilities, these local health facilities appear to have been under-utilised. Although traditional health providers have received little attention from the government, they have survived and continued to play an important role in providing health care, including maternal and child health services, in rural communities. For example, 39 per cent of births taking place during the period 1982 to 1987 were assisted by traditional birth attendants (Table 4.9). Home treatment was also a major response to illness in the region.

Logistic regression was used to examine the factors related to the low level of utilisation of preventive health services (Chapter Five). Several sets of variables were posited to have influenced the utilisation of preventive health services. These

included the demographic and socio-economic background of the women and their households, previous contact with modern-trained health providers and the availability of health services. The four forms of utilisation of health services covered by the data were analysed separately. Several findings were common to all forms of utilisation of preventive health care, with the exception of attendant at childbirth, after adjusting for the effect of place of residence. Education, particularly of women, was a significant predictor of the utilisation of preventive health services for all the indices used. It is not clear, however, whether cognitive and behavioural changes or the socio-economic background of the women or both explain the differences in the utilisation of health services. All statistical models indicated that only secondary or higher education had a significant influence on the use of health services. Those who had continued education beyond the compulsory level (formerly four-year and currently six-year primary education) were generally better off economically and likely to have been socially privileged and live in urban areas. Their family backgrounds may therefore play a role in determining their use of health services. In addition, health services were highly concentrated in urban areas, thus access to health services also had a significant role.

Interestingly, the relationship between women's education and choices of childbirth practices was more complex: the likelihood of women using modern-trained health providers for childbirth was significantly higher for both illiterate and secondary or higher educated women (Table 5.9). The high level of use of health services among illiterate women could be explained in part by access to health services. However, apart from accessibility to local health services, the results from the case studies indicated that rural villagers tended to use modern health providers in towns rather than the village because of the perceived better quality care, superiority, and effectiveness (Chapter Five, Section 5.2). Although use of modern childbirth facilities may have involved a relatively high cost, many villagers still used modern types of health personnel provided by health personnel with higher qualifications. Most village women planned to give birth in hospitals in towns rather

than in the health centre. Those who delivered their babies in the health centre were all emergency cases. Apart from women's education, husband's education, family support, access to health resources, and previous contact with modern-trained staff (doctor, nurse, and midwife) were also powerful predictors in determining the utilisation of maternal and child health services in the Northeast.

The explanatory variables used to analyse the determinants of ownership of health record cards capture wider aspects of health service utilisation than the other three utilisation indicators. They reflect the current circumstances of individuals and households, including the age and sex of child, occupation of mother and father, possession of household items, source of drinking water and sanitation. Three variables remained statistically significant after controlling for the age of child and place of residence: type of prenatal care, education of father, and ownership of a radio (Table 5.13). This indicates the consistency of the sets of variables which significantly influence the utilisation of preventive health services in Northeast Thailand. These include access to health services, socio-economic conditions and previous contact with modern health providers.

The study explored the utilisation of local health facilities using both quantitative and qualitative data obtained from the case study village. In general, the level of women's use of preventive health services in the case study village was comparatively high. Almost all women (97 per cent) received prenatal care, 90 per cent of births took place in institutions, 95 per cent of births were attended by modern health providers, 80 per cent of children owned health record cards, and at least 80 per cent of children were completely immunised (Tables 5.14 and 5.15). The health centre was used extensively for prenatal care but not for childbirth, while traditional birth attendants were also used to some extent in the village. The questions asked in the field research on the tetanus toxoid injection were slightly different from the TDHS questions. The results revealed lower levels of tetanus toxoid vaccination in the study village (62 per cent) than the TDHS (73 per cent for rural areas). Aside from sampling error, to some extent this probably reflects an

exaggeration of the level of vaccination on the part of pregnant women in the TDHS data; they may have confused the tetanus toxoid injection with other injections received during pregnancy. As many as 33 per cent of the women in the case study village reported that they were given other injections.

The case study also explored why nearly one-fourth of the children did not own health record cards. The health record cards or other health cards or booklets are important indicators of health knowledge. They contain the personal details of the child, and also health information such as guidelines for feeding and immunisation which is essential for the health of the child. This is a particularly important source of health knowledge in rural areas where other forms of health education are uncommon. The results suggest that many children who were greatly in need of health attention missed out on health programs and did not have health record cards.

Traditional beliefs and practices such as food restrictions (*ka lam*) during pregnancy and the postpartum period were still maintained in the case study village. *Ka lam* has implications for the health of both the woman and her new-born baby, since many kinds of food are completely withdrawn for a period of about a month. The postpartum woman is only allowed to eat grilled rice and salt and drink hot water, which would undoubtedly affect the production of breast milk and the health and nutrition of the woman. Although most of the village women gave birth in the hospitals or were attended by modern trained health providers, they maintained the postpartum resting period (*yu kam* or *yu fai*) and *ka lam* at home. Another harmful practice which was common in the case study village was the over-consumption and mis-use of drugs, including among postpartum women and young children. The preference for injections over other forms of drug preparations was obvious, particularly among adults. Misconceptions, lack of knowledge about modern pharmaceuticals, and easy access to modern drugs were among the many factors influencing the widespread use of drugs in the case study village.

Nutritional status. Patterns of growth and undernutrition among children aged 3-36 months were examined using the WHO-NCHS population as a reference standard (Chapter Six). The results indicate that the gain in height and weight of the children in the Northeast for the first five months of life was satisfactory relative to the reference standard (Figure 6.9). The rates of growth then dropped noticeably and did not again approach the reference standard, except for weight-for-height or acute undernutrition. The most prevalent form of acute undernutrition coincided with the peak of diarrhoeal morbidity at the ages of 12-23 months. There was also evidence that diarrhoea occurred at very young ages. In the Northeast, twenty per cent of children aged 0-5 months experienced diarrhoea in the two weeks before the survey (Table 6.10). Profound diarrhoea and malnutrition interaction could have influenced the health status of children in this age group. Although several causes can contribute to a high level of diarrhoeal morbidity among young children, contamination of weaning food was found by this study to be important. The case study revealed that boiled water was given to babies soon after birth and semi-solid food, particularly roasted and chewed sticky rice, was also introduced as early as the first few weeks of life. In such circumstances, supplementary foods are prone to contamination and the children are susceptible to infection. There was evidence that children at weaning age, after six months, were often cared for by other family members such as grandparents and older siblings who might have little control over the child's feeding practices. It was also found that non-local food, particularly sweets and instant noodles, were popular among children and parents had little control over the choice of food consumed by the children.

In terms of height-for-age, Northeast children were considerably disadvantaged in relation to the reference standard: at the ages of 3-5 months children in the Northeast were about half a standard deviation below the reference mean (Figure 6.9). However, the TDHS anthropometric data, particularly for the height of young infants, is likely to be unreliable for a number of reasons, including the difficulty of measuring the recumbent length in very young infants. Further

analysis of the correlates of malnutrition in Chapter Seven, therefore, was confined to children aged 6-36 months.

In analysing correlates of malnutrition in this age group, two nutritional indices, low height-for-age (chronic malnutrition) and low weight-for-age (underweight), were used relative to the WHO-NCHS reference population. Although generally considered to be the best indicator for acute malnutrition, the low weight-for-height index was not analysed here because a relatively small proportion of children was acutely malnourished. The conventional cut-off point of 2 standard deviations below the reference median was employed for the study.

Malnutrition among children aged 6-36 months in the Northeast was characterised by moderate levels both of chronic malnutrition and underweight based on the global standard. One in four children suffered from chronic malnutrition or stunting (Table 7.1). These children were shorter relative to age- and sex-specific standards. This linear growth deficit reflects the experience of past recurrent infections and inadequate nutrient intake. The underlying causes of these problems are numerous and include the socio-economic and environmental conditions under which the children are raised. Chronic malnutrition increased with the age of child relative to the international standard. No sex bias was observed, but the data indicate marked urban-rural differences: children in urban areas were better off nutritionally than children in rural areas.

Multivariate analysis of chronic malnutrition confirmed that among the variables included in the logistic model, four remained significant after controlling for the effect of other variables, including age of child and place of residence. The four were ownership of a radio (a proxy for household economic status), father's education, mother's height, and ownership of health record card (Table 7.3). The effect of maternal education on chronic malnutrition of children was weakened when other variables were included in the model. Further analysis indicated that maternal education interacted with other variables included in the model to affect child nutrition (Table 7.4). These variables included paternal education, urban-rural

residence, ownership of a radio, and ownership of health record cards. Maternal nutrition influenced child nutrition, probably through lower birthweight.

The current nutritional status of children, expressed in terms of weight-for-age, was also examined in this study. Weight is sensitive to immediate nutritional and environmental stress, including infections. In the Northeast, one in three children were lighter than their expected age compared to the WHO-NCHS reference (Table 7.1). Five variables remained significant in the multivariate analysis after adjusting for age of child and place of residence: ownership of a radio, mother's height, mother's age, mother's education, and type of birth attendant (Table 7.5). On the whole, the current nutritional status of children aged 6-36 months was influenced by maternal factors, including maternal height, maternal education, and maternal age. Child care practices, particularly by the mother, are crucial to the current nutritional status of children. Ownership of a radio was also found to be significantly associated with low malnutrition and low prevalence of diarrhoea.

Maternal nutritional status, as measured by height, was a significant predictor for both current and chronic malnutrition in children. Maternal nutrition can operate in a number of ways to affect child nutritional status. These include the direct effect of maternal nutrition on birth weight and indirect effects, such as socio-economic background, food habits, and other environmental factors. Women who have poor nutritional status tend to have low birth weight babies. Catch-up growth may occur if the babies are breast-fed, but they often do not achieve normal weight since malnourished mothers tend to produce less breast milk than normally nourished mothers (Jelliffe and Jelliffe, 1978b).

Utilisation of preventive health services was also found to significantly influence the nutritional status of children in the Northeast. This reflects the better socio-economic background and better child care of those who used health services. Child health and survival during the early stage of life depend entirely on care provided by the mother. The use of preventive health services directly influences

child health through immunisation and perhaps indirectly through the knowledge that the mother gains during her contact with the health providers.

The analysis of utilisation of health services indicated that those who used such services were likely to have access to health facilities. This was confirmed by the three variables describing availability of health services: distance to the nearest public health facility, time to the nearest health facility, and type of public health facility in locations. This finding supports the government policy of expanding health facilities to reach a wider population in rural areas. However, the case study indicated somewhat lower utilisation of preventive health services in the local health centre. People by-passed the local health facility in order to utilise better equipped health services in district hospitals and provincial and university hospitals with highly qualified staff. The local health facility was used more extensively for curative care. Curative services tended to be regarded by staff and clients as the most important task of the health centre, and health workers spent most of their time providing these services. To a certain extent, this contradicts government policies on the development of rural health services, which are supposed to be oriented towards preventive care. Meanwhile, traditional practitioners, who are largely ignored by the government, survived and were also being utilised for culative care. Over-consumption and mis-use of drugs were also common among the villagers. This is due partly to the availability of drugs in the village and lack of knowledge on drug use.

Diarrhoeal diseases. Data on childhood diarrhoea was the only morbidity data collected in the TDHS. The mothers or child carers were asked whether their children had experienced diarrhoea within the 24-hour and two-week periods prior to the survey. The accuracy of this type of data collection depends on mothers' perceptions, which tend to vary across socio-economic strata and which are influenced by the education of the mother. Better educated mothers tend to have better socio-economic backgrounds and are likely to be exposed to modern knowledge related to health. Thus, they tend to recognise diarrhoeal episodes more

often than illiterate mothers. The results from Chapter Six indicate that the overall prevalence of diarrhoea among children under five was six per cent for the 24-hour reference period and 16 per cent for the two-week period. No significant variation was observed across regions. The prevalence of diarrhoea varied markedly by age of child: very high proportions of children were reported to have had diarrhoea at younger ages (18 per cent at age of 0-5 months), with a peak being reached at the age of 12-23 months (Table 6.10). The relatively high prevalence of diarrhoea among young children in the Northeast could be explained in part by the pattern of feeding practices as previously discussed. As suggested by the case study, this is likely to reflect feeding practices in the Northeast whereby semi-solid food, especially roasted chewed sticky rice, is introduced as early as the first month of life (Table 6.8). In addition, the cessation of breastfeeding and the shift to adult food is likely to take place during the second year of life; this could impact on food consumption of the children. It was also observed in the case studies that many young children refused to eat weaning food, preferring sweets. The poor household environment and hygienic practices under which the children were raised also contributed to the high prevalence of diarrhoea in young infants in the Northeast. Urban and rural differentials in diarrhoea were also observed, with a higher prevalence of diarrhoea among rural than urban children all age groups (Table 6.11).

The relationships between the prevalence of diarrhoea and explanatory variables, examined individually in Chapter Eight revealed that fourteen variables were significantly associated with the high prevalence of diarrhoea in the Northeast. These include age of child, breastfeeding status, maternal literacy, paternal literacy, paternal occupation, place of residence, ownership of radio, ownership of refrigerator, ownership of motorcycle, source of drinking water, ownership of toilet facility, type of public health facility in locations, distance to the nearest health facility, and time to the nearest health facility. None of the variables explaining utilisation of preventive health services had a significant effect on the prevalence of diarrhoea (Tables 8.1, 8.2, 8.3, and 8.4).

A model to explain diarrhoeal prevalence was examined using logistic regression. All explanatory variables were fitted hierarchically in logistic models. The final model contained only statistically significant variables associated with the prevalence of diarrhoea, including the two control variables (age of child and urban-rural residence). The variables were, in order of significance level, ownership of a refrigerator, occupation of mother, type of public health facility in location, and ownership of a radio (Table 8.5). These variables were largely to do with the socio-economic background of the individuals and households under examination, with one representing the availability of health care services. The direction of the relationships between the prevalence of diarrhoea and these variables was as expected, except in the case of the current occupation of mother, where lower rates of diarrhoea occurred in children whose mothers were engaged in agricultural activities or were not working than in children whose mothers engaged in non-agricultural activities.

Evidence about morbidity obtained from the field research revealed somewhat different patterns, with nearly half (35 out of 77 children) reported ill in the two-week period prior to the survey (Table 8.13). Fever or fever in combination of other symptoms, were by far the most common forms of illness. Surprisingly, diarrhoea was reported as having occurred in only three children in the same period. Despite local terms for diarrhoea being used, the prevalence was relatively low - only four per cent in the case study village compared to 15 per cent in the TDHS. This difference in the prevalence of diarrhoea could be due to a number of factors, including sampling error, differences in the age distribution of the children, variations in geographic settings, and socio-economic conditions. Despite the low prevalence of diarrhoea, the qualitative data revealed that diarrhoea commonly occurred in infants, and that respondents believed infantile diarrhoea (*sou*) to be a natural phenomenon in child development.

Treatment of childhood diarrhoea was not common in the Northeast; fewer than half (45 per cent) of the children who had experienced diarrhoea in the two

weeks prior to the survey received treatment from a health professional (Table 8.10). As many as 39 per cent of children with diarrhoea received non-prescribed medicine and fewer than half were given ORS (Table 8.12).

In cases of ill-defined illness in children, 25 per cent of children were left untreated in the case study village. Among those who had received treatment, the health centre appeared to be the most common place for treatment, followed by private clinics (Table 8.14). However, treatment was not sought if the illness lasted less than two or three days. The villagers believed that fever or fever in combination with other symptoms such as diarrhoea and coughing was one of the most severe illnesses needing immediate treatment. Oral rehydration therapy was seldom used in treating diarrhoea in the village and ORS was only available in the health centre. There was evidence from the case study that home remedies such as rice water and herbal medicine were also used for treatment of child diarrhoea.

Although the mothers in the study village continued to breastfeed their ill children during the course of illness, they were likely to withhold breastfeeding if they believed that the illness, particular diarrhoea, was caused by the mother eating the wrong foods. Weaning foods were also continued but special preparations, particularly rice porridge or other kinds of soft food, were given. Withholding weaning food and drink were not common, and was due mainly to children refusing to eat.

9.2 The importance of combining quantitative and qualitative approaches

The strength of this research is the combining of quantitative and qualitative research methodologies in studying the complex phenomena of utilisation of health services, child nutrition and health. The combination of the two approaches enabled two important contributions to be made. First, the analysis of the TDHS allowed me to establish the overall patterns and correlates of utilisation of health services, prevalence of malnutrition and diarrhoea in the Northeast. The replication of the TDHS questionnaire in the case study, however, permitted the comparison of

patterns of malnutrition and diarrhoea between the Northeast region and the case study village. These show important differences. For example, diarrhoea was less prevalent in the case study village, but other infectious diseases such as fever and respiratory infections were frequently found in children. Childhood diarrhoea was the only infectious disease reported on in the TDHS. As mentioned in Chapter Two, the village was selected based on certain criteria, particularly that it was located in a subdistrict administrative centre where a health centre was located. Such a village at least has immediate access to government health services, education, transport and road which link the village to district and provincial towns. This type of village may have better access to health and other services than the majority of villages in the Northeast. But there was evidence that malnutrition occurred at a very young age both the Northeast as a whole and the case study village. The occurrence of malnutrition in young children coincided with high prevalence of diarrhoea and other sicknesses. This phenomenon was explored in the qualitative study.

Second, the qualitative study provides a clear insight into the problems of utilisation of local health services, childhood nutrition and health in a specific rural context. These include the broad context of cultural background, environmental conditions and behaviour. This kind of understanding could only be obtained by employing a qualitative approach through various means including in-depth interviews, participant observation and small group discussions. The combination of research approaches thus helps to provide a clear understanding of the effects of social and economic differences with the Northeast region on utilisation of health services, nutrition and health problems. In addition, the contextual understanding of the case study village provides a holistic and multidimensional knowledge of how and why such health and nutrition problems prevail in the Northeast.

9.3 Policy implications and future research

The results of this study have implications for policy and future research on health and public health efforts to improve the health and nutrition of children and women. The implications for health policy for the Northeast population, will be discussed here.

Health interventions must place heavy emphasis on the participation of women. It is women who are responsible for using health services during pregnancy and childbirth, who bring their children for preventive and curative care, make and use ORS to treat diarrhoea, and purchase and prepare infant foods. The relative importance of health services is thus diminished if women cannot fully participate in such activities. An understanding of the factors that limit women's ability and willingness to seek health care is thus crucial to ensuring that health services are used extensively. These factors are believed to encompass a wide range of social, cultural, economic, and behavioural factors which vary in relative importance from place to place. In addition, role conflict and constraint on women's roles of economic activities and child bearing and child rearing have implications for the health and nutritional status of the women themselves, as well as that of their children, affecting the health of a large segment of the population. Thus, maternal and child health interventions should be flexible and based on the practicalities of local daily activities in order to reduce the burden on mothers.

The recent increase in women's participation in the labour market in Thailand as a result of rapid economic growth (Richter et al., 1992: 1-2) is another consideration that has both positive and negative impacts on the health of women and their children. A reduction in breastfeeding among working women, for example, is clearly detrimental to the nutritional status and health of the children. Although this concern was not fully examined in this study, researchers have found evidence that the work status of women has a negative impact on child nutritional status (Kumar, 1978; Popkin, 1980; Chutikul, 1982). In addition, relatively low amount of breast milk production among rural mothers in Thailand, due largely to

the malnutrition of nursing mothers and cultural beliefs, is another concern (Winichagoon et al., 1992: 127). This leads to the early introduction of supplementary feeding in young children. Thus far, no concrete policy has been formulated to reconcile women's conflicting roles of economic production and reproduction. Disadvantaged women who are largely engaged in the informal sector and earn less are often left out of the social security and welfare net. Special attention should therefore be given to these women.

Substantial evidence from the case study village indicates that feeding practices have also changed. Although roasted chewed sticky rice is widely used to feed infants, many kinds of commercial foods such as breast milk substitutes, cereals, and cooked foods are also available and increasingly popular in the village. The supplementary food preparation methods promoted by the health workers in the village were not followed; although locally available foods (such as sesame seeds, rice, and peanuts) were used. The children did not like the supplementary food, the method of preparation was impractical for many villagers, and the food was not considered to be children's food. A similar result was also found in a study by the Division of Nutrition (1992: 12). Perhaps the preparation methods should be adopted to the practical needs of women and the tastes of children. Education should aim to impart correct knowledge of the nutritive value of foods and the importance of adequate nutrition, including preparation of food. Various methods of education should be used including mass media advertising and home visits, as well as improvement in the health care network.

Child care is another area of recommended intervention. The conflicting roles of women need to be reconciled in order to benefit the health and well-being of women and their children. Although the family still plays a significant role in providing child care, particularly in rural communities in Thailand, recent economic, social, and demographic changes have brought about the need for new child care options (Wongboonsin, 1991: 3; Richter et al., 1992: 1). The private sector has begun to play a major role in providing child care such as day care centres, nurseries,

and kindergartens, but these facilities are mostly located in Bangkok and large provincial towns. A demand for child care was also observed in the case study village, but little attention has been given by the local health workers to the issue of child care in rural communities. These areas of intervention should be a high priority for public policy. Further research is also required to identify and measure appropriate child care arrangements for different socio-economic strata in various regions of the country, so that a more rational allocation of resources can be made.

The quality and coverage of the nutritional surveillance system is still inadequate. The malnutrition levels obtained from both the national surveillance system and surveys appear to be underestimated. In the case study village, at least two malnourished children were missed by the system. Although the growth monitoring program in Thailand has been expanded to cover wider areas - from 61 per cent of the country in 1985 to 90 per cent in 1990 - it has been estimated that at least 10 per cent of the children under five years of age in rural areas miss out on the program (Nutrition Division, 1992: 6). The loss of children from the system is attributable to seasonal or permanent migration, mother's attitudes, and high opportunity costs of participation for mothers (Nutrition Division, 1992: 7). The under-reported national malnutrition level has undoubtedly masked health problems and misled those seeking optimum approaches. It is therefore suggested that additional data, both from cross-sectional surveys and qualitative research are required to supplement the data already available from the surveillance system.

The reduction of moderate and severe malnutrition in the under fives and supplementary feeding for those identified to be moderately and severely malnourished have been the principal aims of the nutrition and growth monitoring promotion. Although the new direction of the nutrition approach has evolved since the beginning of the Fifth National Development Plan (1982-1986), nutritional programs are still used as a stopgap measure to relieve the most severe form of malnutrition, in other word, a curative rather than a preventive measure. This rather narrow approach fails to address the complexity of malnutrition and infection

problems. It is already known that several factors contribute to malnutrition, including infection, inadequate local food availability, types of weaning foods, socio-economic factors, cultural beliefs, environmental conditions, and contamination of food. The environmental conditions in the Northeast in particular still lag behind other regions in Thailand. Broad public health and nutrition measures are thus indispensable in tackling persisting health problems in the Northeast.

Among the measures to improve the health of children and women in the Northeast, the wider provision of health services in rural areas is urgently needed. There is substantial evidence that easy access to health services has resulted in greater use of the available health services. However, the low quality of health care services and providers deters many women from using local health facilities. One of the goals of the Seventh Health Plan is to improve the quality and capability of the local health facilities by increasing the number of health workers and upgrading medical equipment. This approach, although easing the problem of shortage of staff and equipment to some extent, needs to be taken one step further. Health workers also need to be provided with broader knowledge on health as well as on the local socio-cultural and environmental circumstances which influence behaviour.

Evidence from the case study and from previous studies (Luangthongkham et al., 1989: 36; Schelp et al., 1990: 122) indicate that diarrhoea is not the only illness which commonly afflicts young children in the Northeast. Fever and other manifestations of respiratory illness are common. Thus, the emphasis on diarrhoea in the malnutrition-infection syndrome could be misplaced in Northeast Thailand or in other places in developing countries. Information is generally lacking on morbidity, and this hypothesis requires further research.

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APPENDIX A

Field survey questionnaire

(1) Household Questionnaire

Household identification number _ _ _

Name of respondent ..... **(not coded)**

Name of interviewer ..... **(not coded)**

Date of interview (D-M-Y) _ _ / _ _ / _ _

Eligible household with:

[ ] **Pregnant woman**

[ ] **Lactating mother**

[ ] **Children 0-4 years old**

[ ] **Sick children**

[ ] **Old women**

Data entry

.....

A) Household schedule *

No	Names of usual residents and visitors	Relationship to head of household	Residence: Does (name) usually live here ?		Residence: Has (name) been away from home for > 3 months, if so where?		Sex		Age	Marital status	Educa-tion
(1)	(2)	(3)	(4) Yes	(4) No	(5) Yes	(5) No	(6) M	(6) F	(7)	(8)	(9)
01		HH headed	1	2	1	2	1	2	- -	-	-
02			1	2	1	2	1	2	- -	-	-
03			1	2	1	2	1	2	- -	-	-
04			1	2	1	2	1	2	- -	-	-
05			1	2	1	2	1	2	- -	-	-
06			1	2	1	2	1	2	- -	-	-
07			1	2	1	2	1	2	- -	-	-
08			1	2	1	2	1	2	- -	-	-
09			1	2	1	2	1	2	- -	-	-
10			1	2	1	2	1	2	- -	-	-
11			1	2	1	2	1	2	- -	-	-
12			1	2	1	2	1	2	- -	-	-
13			1	2	1	2	1	2	- -	-	-
14			1	2	1	2	1	2	- -	-	-
15			1	2	1	2	1	2	- -	-	-

1	Total number of household members		_ _
2	Total number of children aged 0-5 years		_
3	Number of ever married women aged 15-49		_
4	Household with parents or grand parents		
		Yes	[ ] 1
		No	[ ] 2
5	Type of family		
		Nuclear and husband headed	[ ] 1
		Nuclear and woman headed	[ ] 2
		Extended and husband headed	[ ] 3
		Extended and woman headed	[ ] 4
		Other	[ ] 8

Quest No	Question	Values
	B) Household socioeconomic background	
*6	Does your household have a generator or electricity?	
	Yes, has electricity	[ ] 1
	Yes, has a generator	[ ] 2
	Not at all	[ ] 3
*7	Does your household have a radio?	
	Yes	[ ] 1
	No	[ ] 2
*8	Does your household have a TV set?	
	Yes	[ ] 1
	No	[ ] 2

Quest No	Question	Values
*9	Does your household have a refrigerator?	
	Yes	[ ] 1
	No	[ ] 2
*10	Does your household have a bicycle?	
	Yes	[ ] 1
	No	[ ] 2
*11	Does your household have a motorcycle?	
	Yes	[ ] 1
	No	[ ] 2
*12	Does your household have a car/truck?	
	Yes	[ ] 1
	No	[ ] 2
13	Does your household own cultivated land?	
	Yes	[ ] 1
	No	[ ] 2 -> No 16
14	How many *rai* of land does your household own?	___
15	Was the land being used for cultivation last year?	
	Yes	[ ] 1
	No	[ ] 2
16	What is the major source of income/support/livelihood for you and your children?	
	Support of husband or father of children	[ ] 1
	From shared earning family farm	[ ] 2
	Own subsistence farming	[ ] 3
	Own farming and produce sales	[ ] 4
	Own earning animal husbandry	[ ] 5
	Own earning sewing/handcraft	[ ] 6
	Own earning salaries/wages	[ ] 7
	Own earnings from other	[ ] 98
	C) Household environment	
17	What is the main source of drinking water for your household now (hot season)?	
	Private well	[ ] 1
	Public well	[ ] 2
	Rain water	[ ] 3
	River or surface water	[ ] 4
	Other	[ ] 8
18	What was the main source of drinking water for your household in the last cool season?	
	Private well	[ ] 1
	Public well	[ ] 2
	Rain water	[ ] 3
	River or surface water	[ ] 4
	Other	[ ] 8

Ques No	Question	Values
19	What was the main source of drinking water for your household in the last wet season?	
	Private well	[ ] 1
	Public well	[ ] 2
	Rain water	[ ] 3
	River or surface water	[ ] 4
	Other	[ ] 8
20	What is the main source of non-drinking water for household use now (hot season)?	
	Private well	[ ] 1
	Public well	[ ] 2
	Rain water	[ ] 3
	River or surface water	[ ] 4
	Other	[ ] 8
21	What was the main source of non-drinking water for household used in the last dry season?	
	Private well	[ ] 1
	Public well	[ ] 2
	Rain water	[ ] 3
	River or surface water	[ ] 4
	Other	[ ] 8
22	What was the main source of non-drinking water for household used in the last wet season?	
	Private well	[ ] 1
	Public well	[ ] 2
	Rain water	[ ] 3
	River or surface water	[ ] 4
	Other	[ ] 8
*23	What kind of toilet facility does your household have?	
	No facility	[ ] 0
	Flush	[ ] 1
	Septic tank	[ ] 2
	Pit	[ ] 3
	Other	[ ] 8
*24	What is the main material of the floor of your house?	
	Wood	[ ] 1
	Cement	[ ] 2
	Earth/ground	[ ] 3
	Other	[ ] 8
25	What is the main material of the floor of your kitchen?	
	Wood	[ ] 1
	Cement	[ ] 2
	Earth/ground	[ ] 3
	Other	[ ] 8
26	Where do you usually prepare food now (in the hot season)?	
	In a kitchen in a house	[ ] 1
	In a kitchen outside a house	[ ] 2
	On the ground	[ ] 3
	Other	[ ] 8

Ques No	Question	Values
27	Where did you usually prepare food in the last dry season?	
	In a kitchen in a house	[ ] 1
	In a kitchen outside a house	[ ] 2
	On the ground	[ ] 3
	Other	[ ] 8
28	Where did you usually prepare food in the last wet season?	
	In a kitchen in a house	[ ] 1
	In a kitchen outside a house	[ ] 2
	On the ground	[ ] 3
	Other	[ ] 8
29	Where do you usually keep cooked food?	
	In a cupboard	[ ] 1
	Left outside with covers	[ ] 2
	Left without covers	[ ] 3
	Other	[ ] 8
*30	Do you have a cake of soap right now?	
	Yes	[ ] 1
	No	[ ] 2
31	How do you usually wash your hands?	
	Water only	[ ] 1
	Water and soap	[ ] 2
	Water and other detergent	[ ] 3
	Other	[ ] 8
32	Is there any kind of antibiotic drug (local name) being kept in your house?	
	Yes	[ ] 1
	(specify)	
	No	[ ] 2
	Don't know	[ ] 9
33	Is there any kind of pain relief medicine being kept in your house?	
	Yes	[ ] 1
	(specify)	
	No	[ ] 2
	Don't know	[ ] 9
34	Is there any kind of commercial ORS being kept in your house?	
	Yes	[ ] 1
	(specify)	
	No	[ ] 2
	Don't know	[ ] 9
	Check No. 3	
	If the answer > 0, go to **women questionnaire**	

(2) Women Questionnaire
(Only asked of ever married women)

Woman identification number _ _ _ / _

Household identification number _ _ _

Name of a woman ..... (not coded)

Date of interview _ _/_ _/_ _ (D-M-Y)

Ques No	Question	Values
	A) Woman's socio-demographic background	
1	In what day, month and year were you born?	_ _/_ _/_ _
*2	How old were you at your last birthday?	_ _
3	How was age reported?	
	Self reported	[ ] 1
	Identification card	[ ] 2
*4	What is the highest level of school you attended?	
	No school	[ ] 0
	Not completed primary	[ ] 1
	Completed primary	[ ] 2
	Secondary	[ ] 3 -> No 6
	Teaching college	[ ] 4 -> No 6
	Vocational	[ ] 5 -> No 6
	University	[ ] 6 -> No 6
	Others ..... (specify)	[ ] 8 -> No 6
*5	Can you read and understand a letter or newspaper?	
	Easily	[ ] 1
	Not at all	[ ] 2
	With difficulty	[ ] 3
6	Have you ever lived outside the village more than 3 months?	
	Yes	[ ] 1
	No	[ ] 2 -> No 9
7	If yes, where did you live?	
	Rural village	[ ] 1
	Urban or city	[ ] 2
	Other	[ ] 8
8	How long had you been living there?	_ _
9	Where were you born?.....	
	In this village	[ ] 1
	Other village in Khonkaen province	[ ] 2
	Other village in other province in Northeast region	[ ] 3
	City or town in Northeast	[ ] 4
	Other village in other region	[ ] 5
	City or town in other region	[ ] 6
	Other	[ ] 8

	Ques No	Question	Values
*	10	Are you now working including work on a family farm or in a business run by your family?	
		Yes	[ ] 1
		No	[ ] 2 -> No 18
*	11	What kind of work are you now engaged in?	
		Prof./Tech./Manag	[ ] 1 -> No 13
		Clerical	[ ] 2 -> No 13
		Sales	[ ] 3 -> No 13
		Agriculture self employed	[ ] 4
		Agriculture employee	[ ] 5
		Household and domestic	[ ] 6 -> No 13
		Services	[ ] 7 -> No 13
		Skilled manual	[ ] 8 -> No 13
		Unskilled manual	[ ] 9 -> No 13
		Other	[ ] 98 -> No 13
*	12	Whose land do you mainly work in?	
		Own land	[ ] 1
		Family land	[ ] 2
		Someone else's land	[ ] 3
	13	Where is your usual work place?	
		At home	[ ] 1
		Outside home but in the village	[ ] 2
		Outside the village	[ ] 3
		Other	[ ] 8
	*14	Whom do you work for?	
		For family	[ ] 1
		For other	[ ] 2
		Self employed	[ ] 3
		Other	[ ] 8
	*15	How are you paid?	
		In cash	[ ] 1
		In kind	[ ] 2
		Not paid	[ ] 3
		Other	[ ] 8
	16	How many hours did you spend working yesterday?	_ _
	17	How many days did you spend working last week?	_
	18	Did you work regularly to earn money, including working on a farm or in a business run by your family last year?	
		Yes	[ ] 1
		No	[ ] 2 -> No 20

Ques No	Question	Values
19	What kind of job were you mainly engaged in last year?	
	Prof./Tech./Manag	[ ] 1
	Clerical	[ ] 2
	Sales	[ ] 3
	Agriculture self employed	[ ] 4
	Agriculture employee	[ ] 5
	Household and domestic	[ ] 6
	Services	[ ] 7
	Skilled manual	[ ] 8
	Unskilled manual	[ ] 9
	Other	[ ] 98
*20	Before you married, did you ever worked regularly to earn money, other than on a farm or in a business run by your family?	
	Yes	[ ] 1
	(specify)	
	No	[ ] 2
*21	Since you were married, have you ever worked regularly to earn money, other than on a farm or in a business run by your family?	
	Yes	[ ] 1
	(specify)	
	No	[ ] 2
22	Check the household schedule.	
	If the woman is married, go to No 23	
	If divorced or separated or widowed, go to No 29	
	B) Husband's social background	
*23	What is your husband highest level of education?	
	No school	[ ] 0
	Not completed primary	[ ] 1
	Completed primary	[ ] 2
	Secondary	[ ] 3 -> No 25
	Teaching college	[ ] 4 -> No 25
	Vocational	[ ] 5 -> No 25
	University	[ ] 6 -> No 25
	Others	[ ] 8 -> No 25
	Don't know	[ ] 9
*24	Can your husband read or understand a letter or newspaper?	
	With difficulty	[ ] 1
	Easily	[ ] 2
	Not at all	[ ] 3
	Don't know	[ ] 9

	Ques No	Question	Values
*	25	What kind of work did your husband mainly do last week?	
		Not worked	[ ] 0
		Prof./Tech./Manag	[ ] 1
		Clerical	[ ] 2
		Sales	[ ] 3
		Agriculture self employed	[ ] 4 -> No 27
		Agriculture employee	[ ] 5 -> No 27
		Household and domestic	[ ] 6
		Services	[ ] 7
		Skilled manual	[ ] 8
		Unskilled manual	[ ] 9
		Other	[ ] 98
		Don't know	[ ] 99
*	26	Did your husband earn a regular wage or salary last week?	
		Yes	[ ] 1 -> No 29
		No	[ ] 2 -> No 29
		Don't know	[ ] 9 -> No 29
	*27	Whose land did your husband work on?	
		Own land	[ ] 1 -> No 29
		Family land	[ ] 2 -> No 29
		Someone else's land	[ ] 3
*	28	Did he work mainly for money or for a share of the crops?	
		For money	[ ] 1
		For a share of the crops	[ ] 2
		Both	[ ] 3
		C) Obstetric history	
	*29	Are you pregnant now?	
		Yes	[ ] 1
		No or not sure	[ ] 2 -> No 34
*	30	How many months have you been pregnant?	
		(Don't know coded 98)	_ _
	*31	Did you see anyone for a check on this pregnancy?	
		Yes	[ ] 1
		No	[ ] 2 -> No 34
	*32	Whom did you see?	
		Doctor	[ ] 1
		Trained nurse/midwife	[ ] 2
		Traditional birth attendant	[ ] 3
		Other	[ ] 8
	*33	Since you became pregnant, have you been given any injection to prevent the baby getting tetanus or convulsions after birth?	
		Yes	[ ] 1
		No	[ ] 2
		Don't know	[ ] 9

Ques No	Question	Values
34	How many pregnancies have you ever experienced?	
	(specify)	_ _
	(If none, go to No 90)	
35	How many boys were born alive?	
		_ _
36	How many girls were born alive?	_ _
37	How many children 0-5 years do you have?	
	All children 0-5 years	_
	Boys	_
	Girls	_
	(If no children, go to No 90)	
	D) Previous pregnancy history	
38	In your previous pregnancy, did you see anyone for a check on your pregnancy? If yes, who did you see?	
	None	[ ] 0 -> No 44
	Doctor	[ ] 1
	Trained nurse/midwife	[ ] 2
	Traditional birth attendant	[ ] 3
	Other	[ ] 8
39	If yes, who advised you?	
	None	[ ] 0
	Your mother	[ ] 1
	Your father	[ ] 2
	Your husband's mother	[ ] 3
	Your husband's father	[ ] 4
	Other relatives	[ ] 5
	Health personnel	[ ] 6
	Other	[ ] 8
40	How many times did you have your pregnancy check up?	_ _
41	When was your first pregnancy check up? (months of pregnancy)	_ _
	(Don't know coded 99)	
42	Were you given any injection during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2 -> No 45
43	If yes, what for? (specify)	
	Tetanus injection	[ ] 1 -> No 45
	May be tetanus injection	[ ] 2 -> No 45
	Other	[ ] 3 -> No 45
	Don't know	[ ] 9 -> No 45
44	If you did not attend antenatal clinic or see health personnel, why not?	
	.....	_ _
45	Did your have vaginal bleeding during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2

Ques No	Question	Values
46	Did you have a severe headache during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2
47	Did you have a severe vomiting during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2
48	Did you ever have high fever during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2
49	Did you ever have legs oedema during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2
50	Were you given any kind of medicine during your previous pregnancy?	
	Yes	[ ] 1
	(specify)	
	No	[ ] 2
51	Do you believe that a pregnant woman has to adhere to food restriction?	
	Yes	[ ] 1
	No	[ ] 2 -> No 53
52	If yes, what kind of food should a pregnant woman not take?	
	(specify)	_ _
53	Did you have any food taboos during your previous pregnancy?	
	Yes	[ ] 1
	No	[ ] 2 -> No 55
54	If yes, please specify.....	_ _
55	Did you stop taking any kind of your usual meat during your previous pregnancy, if yes how?	
	Stop taking all kind of meat	[ ] 1
	Stop taking some kind of meat	[ ] 2
	(specify)	
	Taken as usual	[ ] 3
	Never taken	[ ] 4
56	Did you stop taking any kind of your usual fresh water fish during your previous pregnancy, if yes how?	
	Stop taking all kind of fish	[ ] 1
	Stop taking some kind of fish	[ ] 2
	(specify)	
	Taken as usual	[ ] 3
	Never taken	[ ] 4
57	Did you stop taking egg during your previous pregnancy?	
	Stopped taking	[ ] 1
	Taken as usual	[ ] 3
	Never taken	[ ] 4

Ques No	Question	Values
58	Did you stop taking any kind of your usual vegetables during your previous pregnancy, if yes how?	
	Stop taking all kind of vegies	[ ] 1
	Stop taking some kind of vegies	[ ] 2
	(specify)	
	Taken as usual	[ ] 3
	Never taken	[ ] 4
59	Did you stop taking any kind of fruit during your previous pregnancy, if so how?	
	Stop taking all kind of fruit	[ ] 1
	Stop taking some kind of fruit	[ ] 2
	(specify)	
	Taken as usual	[ ] 3
	Never taken	[ ] 4
60	Did you stop taking any spicy food during your previous pregnancy?	
	Stop taking all kind of spicy	[ ] 1
	Stop taking some kind of spicy	[ ] 2
	(specify)	
	Taken as usual	[ ] 3
	Never taken	[ ] 4
61	Did you stop taking any kind of seafood during your previous pregnancy, if so how	
	Stop taking all kind of seafood	[ ] 1
	Stop taking some kind of seafood	[ ] 2
	(specify)	
	Taken as usual	[ ] 3
	Never taken	[ ] 4
62	Did you ever drink any kind of milk during your previous pregnancy, if so how?	
	Drink as usual	[ ] 1
	No	[ ] 2
	Never taken	[ ] 3
63	What was the outcome of your previous pregnancy	
	Baby born alive	[ ] 1
	Miscarriage	[ ] 2 -> No 90
	Others	[ ] 8 -> No 90
64	Is the child still alive?	
	Yes	[ ] 1 -> No 66
	No	[ ] 2
65	If no, could you tell me what caused the child's death?	
	.....	_ _
66	After giving birth, did you practise postpartum confinement?	
	Yes	[ ] 1
	No	[ ] 2 -> No 69

Ques No	Question	Values
67	If yes, who advised you?	
	Your parents	[ ] 1
	Your in-law	[ ] 2
	Your relatives	[ ] 3
	Others	[ ] 8
68	How long was your confinement period?	_ _
69	Do you believe that a woman should adhere to food restriction right?	
	Yes	[ ] 1
	No	[ ] 2 -> No 71
70	If yes, please specify	_ _
71	Did you stop taking any kind of food after delivery?	
	Yes	[ ] 1
	No	[ ] 2 -> No 73
72	If yes, please specify	_ _
73	Did you stop taking any kind of your usual meat after delivery, if so how?	
	Stop taking all kind of meat	[ ] 1
	Stop taking some kind of meat (specify)	[ ] 2
	Taken as usual	[ ] 3
	Never taken	[ ] 4
74	Did you stop taking any kind of your usual fresh water fish after delivery, if so how?	
	Stop taking all kind of fish	[ ] 1
	Stop taking some kind of fish (specify)	[ ] 2
	Taken as usual	[ ] 3
	Never taken	[ ] 4
75	Did you give up taking any kind of fruit after delivery, if so how?	
	Stop taking all kind of fruit	[ ] 1
	Stop taking some kind of fruit (specify)	[ ] 2
	Taken as usual	[ ] 3
	Never taken	[ ] 4
76	Did you stop taking any kind of your usual vegetables after delivery, if so how?	
	Stop taking all kind of vegies	[ ] 1
	Stop taking some kind of vegies (specify)	[ ] 2
	Taken as usual	[ ] 3
	Never taken	[ ] 4

	Ques No	Question	Values
	77	Did you stop taking any kind of spicy food after delivery, if so how?	
		Stop taking all kind of spicy	[ ] 1
		Stop taking some kind of spicy	[ ] 2
		(specify)	
		Taken as usual	[ ] 3
		Never taken	[ ] 4
	78	Did you stop taking any kind of your usual seafood after delivery, if so how?	
		Stop taking all kind of seafood	[ ] 1
		Stop taking some kind of seafood	[ ] 2
		(specify)	
		Taken as usual	[ ] 3
		Never taken	[ ] 4
	79	Did you ever drink any kind of milk after delivery, if so how?	
		Drink as usual	[ ] 1
		No	[ ] 2
		Never drink	[ ] 3
*	80	Where did you give birth in your previous pregnancy?	
		Government hospital	[ ] 1 -> No 82
		Private hospital	[ ] 2 -> No 82
		Private clinic	[ ] 3 -> No 82
		Health centre	[ ] 4 -> No 82
		At home	[ ] 5
		Others	[ ] 8
	81	What instrument was used to cut a baby's umbilical cord?	
		(specify)	_
*	82	Who assisted with the deliver of the baby?	
		Physician	[ ] 1 -> No 90
		Nurse/midwife	[ ] 2 -> No 90
		Traditional birth attendant	[ ] 3
		Your relatives	[ ] 4 -> No 90
		Others	[ ] 8 -> No 90
	83	If you were assisted by a Traditional birth attendant, did you pay for her service?	
		Yes	[ ] 1
		No	[ ] 2 -> No 90
	84	If yes, how did you pay?	
		In cash	[ ] 1
		In kind	[ ] 2
		Both	[ ] 3
	90	Woman's weight in kilograms	_ _ . _
	91	Woman's height in centimetres	_ _ _ . _

Check No 34
If No 34 > 0, go to children questionnaire.

Children questionnaire
(Ask for all children aged 0-5 years)

Children Identification Number _ _ _ / _ _ _ _

Mother Identification Number (HHID+Sequent No) _ _ _ / _ _ _

Household Identification Number _ _ _ / _

Name of a child ..... (not coded)

Date of interview (D-M-Y) _ _ / _ _ / _ _

Ques No	Question		Values
	A) Immunisation		
1	Sex of the child		
		Male	[ ] 1
		Female	[ ] 2
2	Could you please show me the birth certificate of (name)?		
		Yes	[ ] 1
		No	[ ] 2 -> No 6
3	If yes, reported day (name) born. (99 Not recorded on card)		_ _
4	Reported month (name) born. (99 Not recorded on card)		_ _
5	Reported year (name) born. (99 Not recorded on card)		_ _
6	If (name) has no birth certificate, ask the mother how old is (name) in months completed.		_ _
*7	Could you please show me the health record card of (name)?		
		Yes	[ ] 1
		No	[ ] 2 -> No 43
8	Reported day received BCG (99 Not recorded on card)		_ _
9	Reported month received BCG (99 Not recorded on card)		_ _
10	Reported year received BCG (99 Not recorded on card)		_ _
11	(Name) received BCG		
		Yes	[ ] 1
		No	[ ] 2
12	Check whether (name) has a BCG scar.		
		Yes	[ ] 1
		No	[ ] 2
13	Reported day received DPT1 (99 Not recorded on card)		_ _
14	Reported month received DPT1 (99 Not recorded on card)		_ _
*15	Reported year received DPT1 (99 Not recorded on card)		_ _
16	(Name) received DPT1		
		Yes	[ ] 1
		No	[ ] 2

Ques No	Question	Values
17	Reported day received DPT2 (99 Not recorded on card)	_ _
18	Reported month received DPT2 (99 Not recorded on card)	_ _
19	Reported year received DPT2 (99 Not recorded on card)	_ _
20	(Name) received DPT2	
	Yes	[ ] 1
	No	[ ] 2
21	Reported day received DPT3 (99 Not recorded on card)	_ _
22	Reported month received DPT3 (99 Not recorded on card)	_ _
23	Reported year received DPT3 (99 Not recorded on card)	_ _
24	(Name) received DPT3	
	Yes	[ ] 1
	No	[ ] 2
25	Compute whether (name) received complete DPT based on the MOPH immunisation schedule.	
	Complete	[ ] 1
	Incomplete	[ ] 2
	Never immunised	[ ] 3
26	Reported day received OPV1 (99 Not recorded on card)	_ _
27	Reported month received OPV1 (99 Not recorded on card)	_ _
28	Reported year received OPV1 (99 Not recorded on card)	_ _
29	(Name) received OPV1	
	Yes	[ ] 1
	No	[ ] 2
30	Reported day received OPV2 (99 Not recorded on card)	_ _
31	Reported month received OPV2 (99 Not recorded on card)	_ _
32	Reported year received OPV2 (99 Not recorded on card)	_ _
33	(Name) received OPV2	
	Yes	[ ] 1
	No	[ ] 2
34	Reported day received OPV3 (99 Not recorded on card)	_ _
35	Reported month received OPV3 (99 Not recorded on card)	_ _
36	Reported year received OPV3 (99 Not recorded on card)	_ _
37	(Name) received OPV3	
	Yes	[ ] 1
	No	[ ] 2
38	Compute whether (name) received complete OPV based on the MOPH immunisation schedule.	
	Complete	[ ] 1
	Incomplete	[ ] 2
	Never immunised	[ ] 3

Ques No	Question		Values
39	Reported day received measles vacc. (99 Not recorded on card)		_ _
40	Reported month received measles vacc. (99 Not recorded on card)		_ _
41	Reported year received measles vacc. (99 Not recorded on card)		_ _
42	(Name) received measles vaccine		
		Yes	[ ] 1 -> No 47
		No	[ ] 2 -> No 47
*43	If (name) has no health card, ask the mother whether (name) ever received any vaccination to prevent him/her getting diseases?.		
		Yes	[ ] 1
		No	[ ] 2 -> No 46
		Don't know	[ ] 9 -> No 46
44	How many times has (name) been vaccinated?		_ _
45	What kinds of vaccination has (name) ever had?		
		(specify)	_ _
46	Check whether (name) has a BCG scar?		
		Yes	[ ] 1
		No	[ ] 2
	B) Breastfeeding and weaning practices (Ask only for the youngest child)		
* 47	Did you ever feed (name) at the breast?		
		Yes	[ ] 1
		No	[ ] 2 -> No 56
48	If yes, how many days after (name) was born did you put (name) to the breast? (don't know coded 99)		_ _
49	Did you give the child the first milk or the yellowish milk?		
		Yes	[ ] 1
		No	[ ] 2
50	Did you give the child any kind of food or drink shortly after birth?		
		Yes	[ ] 1
		No	[ ] 2 -> No 52
51	If yes, please specify		_ _
* 52	Are you still breastfeeding (name)?		
		Yes	[ ] 1
		No	[ ] 2
53	How many months was (name) exclusively breast-fed? (don't know coded 99)		_ _
54	Apart from breast milk, was (name) given any kind of commercial milk?		
		Yes	[ ] 1
		No	[ ] 2 -> No 57

Ques No	Question	Values
55	If yes, what kind of milk?	
	Infant formula	[ ] 1 -> No 57
	Fresh goat/cow milk	[ ] 2 -> No 57
	Sweetened condensed milk	[ ] 3 -> No 57
	Others	[ ] 8 -> No 57
56	If (name) was not breast-fed, what kind of breast milk substitute (name) was given?	
	None	[ ] 0
	Infant formula	[ ] 1
	Fresh goat/cow milk	[ ] 2
	Sweetened condensed milk	[ ] 3
	Others	[ ] 8
57	Was (name) ever given any kind of food other than breast milk or commercial milk?	
	Yes	[ ] 1
	No	[ ] 2 -> No 64
58	Was (name) ever given ground rice, if so, at what age?	
	Not given	[ ] 0
	< 1 month	[ ] 1
	1-3 months	[ ] 2
	4-6 months	[ ] 3
	7 or more	[ ] 4
	Don't know	[ ] 9
59	Was (name) ever given ground meat, if so, at what age?	
	Not given	[ ] 0
	< 1 month	[ ] 1
	1-3 months	[ ] 2
	4-6 months	[ ] 3
	7 or more	[ ] 4
	Don't know	[ ] 9
60	Was (name) ever given ground fish, if so, at what age?	
	Not given	[ ] 0
	< 1 month	[ ] 1
	1-3 months	[ ] 2
	4-6 months	[ ] 3
	7 or more	[ ] 4
	Don't know	[ ] 9
61	Was (name) ever given ground egg, if so, at what age?	
	Not given	[ ] 0
	< 1 month	[ ] 1
	1-3 months	[ ] 2
	4-6 months	[ ] 3
	7 or more	[ ] 4
	Don't know	[ ] 9

Ques No	Question	Values
62	Was (name) ever given ground vegetable, if so, at what age?	
	Not given	[ ] 0
	< 1 month	[ ] 1
	1-3 months	[ ] 2
	4-6 months	[ ] 3
	7 or more	[ ] 4
	Don't know	[ ] 9
63	Was (name) ever given any kind of fruit, if so, at what age?	
	Not given	[ ] 0
	< 1 month	[ ] 1
	1-3 months	[ ] 2
	4-6 months	[ ] 3
	7 or more	[ ] 4
	Don't know	[ ] 8
	C) General Health and Illness and therapeutic practices (Ask all children aged 0-5 years)	
64	Compared to other children at this age, would you say that (name) is more frequently sick, sick as often, or less frequently sick?	
	More frequently sick	[ ] 1
	Sick as often as others	[ ] 2
	Less frequently	[ ] 3
	No basis for comparison	[ ] 4
	Other	[ ] 8
65	Had (name) ever had measles? (Interviewer uses symptom probes: ever had a fever with rash that lasted more than three days, coughing, a runny rose and red eyes).	
	Yes	[ ] 1
	No	[ ] 2
66	Has (name) ever been in hospital overnight (other than at birth)? How many times?	
	Yes, once	[ ] 1
	Yes, more than once	[ ] 2
	Never	[ ] 3
	Don't know	[ ] 9
67	Is (name) healthy now?	
	Yes	[ ] 1 -> No 69
	No	[ ] 2
	Don't know	[ ] 9
68	What health problems does (name) have at present?	
	Diarrhoea	[ ] 1
	Fever	[ ] 2
	Cough	[ ] 3
	Diarrhoea and fever	[ ] 4
	Diarrhoea and cough	[ ] 5
	Fever and cough	[ ] 6
	Diarrhoea, fever and cough	[ ] 7
	Other	[ ] 98

Ques No	Question	Values
	D) Health Problems and Health Care in the previous two weeks	
69	Has (name) had any health problems in the previous two weeks?	
	Yes	[ ] 1
	No	[ ] 2 -> No 98
	Don't know	[ ] 9 -> No 98
70	If yes, how many times?	_ _
71	Please specify illness or symptoms (name) had in the previous two weeks?	
	Diarrhoea	[ ] 1
	Fever	[ ] 2
	Cough	[ ] 3
	Diarrhoea and fever	[ ] 4
	Diarrhoea and cough	[ ] 5
	Fever and cough	[ ] 6
	Diarrhoea, fever and cough	[ ] 7
	Other	[ ] 98
72	What was the most recent illness or symptom?	
	Diarrhoea	[ ] 1
	Fever	[ ] 2
	Cough	[ ] 3
	Diarrhoea and fever	[ ] 4
	Diarrhoea and cough	[ ] 5
	Fever and cough	[ ] 6
	Diarrhoea, fever and cough	[ ] 7
	Other	[ ] 98
73	How many times did (name) suffer from (same as No 72) in the previous two weeks?	_
74	How long did (name) have (same as No 72)? ..... days	_ _
75	Check No 72 If No 72 equal 1, 4, 5 or 7, go to No 76 For the rest, go to No 79	
76	How many stools did (name) defecate on the worst day (one day and one night)?	
	Number	_ _
77	Was there blood in the stools at any time?	
	Yes	[ ] 1
	No	[ ] 2
78	Had the diarrhoea been accompanied by vomiting at any time?	
	Yes	[ ] 1
	No	[ ] 2
79	Did (name) receive any treatment?	
	Yes	[ ] 1
	No	[ ] 2 -> No 90

Ques No	Question	Values
80	Where was the first source of treatment?	
	Health centre	[ ] 1
	Government hospital	[ ] 2
	Private hospital/clinic	[ ] 3
	Drug store	[ ] 4
	Herbalist	[ ] 5
	Injectionist	[ ] 6
	Home remedies	[ ] 7
	Others	[ ] 8
81	How many days after the onset of the last illness did (name) receive the first treatment? (If don't know coded 99)	_ _
82	Who suggested you should go there?	
	Yourself	[ ] 1
	Your husband	[ ] 2
	Your parents	[ ] 3
	Your in-law	[ ] 4
	Your relatives	[ ] 5
	Your neighbour	[ ] 6
	Health personnel	[ ] 7
	Others	[ ] 8
83	Did (name) receive a second treatment?	
	Yes	[ ] 1
	No	[ ] 2 -> No 90
84	Where was the second source of treatment?	
	Health centre	[ ] 1
	Government hospital	[ ] 2
	Private hospital/clinic	[ ] 3
	Drug store	[ ] 4
	Herbalist	[ ] 5
	Injectionist	[ ] 6
	Home remedies	[ ] 7
	Others	[ ] 8
85	Why did (name) receive a second treatment?	
	..... (specify)	_ _
86	Did (name) receive the third treatment?	
	Yes	[ ] 1
	No	[ ] 2 -> No 90
87	Where was a third source of treatment?	
	Health centre	[ ] 1
	Government hospital	[ ] 2
	Private hospital/clinic	[ ] 3
	Drug store	[ ] 4
	Herbalist	[ ] 5
	Injectionist	[ ] 6
	Home remedies	[ ] 7
	Others	[ ] 8
88	Why did (name) have a third treatment?	
	..... (specify)	_ _
89	How many treatments did (name) have?	_

Ques No	Question	Values
90	Check No 48 If (name) was breast-fed, go to No 91 If not, go to No 94	
91	Had you breast-fed (name) as often as usual during the course of (same as No 72)?	
	Yes, as often as usual	[ ] 1
	No, stopped breastfeeding	[ ] 2
	No, interrupted or irregular	[ ] 3
	No, more often than usual	[ ] 4
92	Did (name) eat foods other than breast milk as usual during the course of (same as No 72)?	
	Yes	[ ] 1
	No, was not eating	[ ] 2
	No, less than usual	[ ] 3
	No, more than usual	[ ] 4
93	Did (name) drink as usual during the course of (same as No 72)?	
	Yes	[ ] 1
	No, was not drinking	[ ] 2
	No, less than usual	[ ] 3
	No, more than usual	[ ] 4
*94	Have you ever heard of ORS? (local name)	
	Yes	[ ] 1
	No	[ ] 2 -> No 96
95	If yes, what for?	
	(specify)	_ _
* 96	Was (name) given any kind of ORS?	
	Yes	[ ] 1
	No	[ ] 2 -> No 98
97	What kind of ORS was (name) given?	
	ORS sachet	[ ] 1
	Commercial electrolyte	[ ] 2
	Homemade ORS	[ ] 3
	Others	[ ] 8
*98	(Name) weight in kilograms	_ _ . _
*99	(Name) height in centimetres	_ _ _ . _
100	How height was measured?	
	Standing position	1
	Recumbent length	2

APPENDIX B

Guidelines of focus group discussion and in-depth interview

A) Focus group discussion and in-depth interview

1. General concepts associated with health, pregnancy and childbirth:

   1.1 Why do they think a person falls ill?

   1.2 What are illness caused?

   1.3 What can be done about them?

   1.4 What do they mean by healthy?

   1.5 How do they view pregnancy and childbirth, whether carrying a child and giving birth risky?

   1.6 Do people usually take any medicine or herbs to maintain good health?

2. Perceptions, beliefs and practices associated with pregnancy, delivery and postnatal period:

   2.1 What are problems that women here usually experienced during pregnancy, delivery and postnatal period?

   2.2 What is the most serious problem in each period? Why?

   2.3 What do they do when such problem arises?

   2.4 What kind of medicine (either traditional or modern) do women usually take during pregnancy, after giving birth? Where did they get such medicine? What for?

   2.5 What prenatal and postnatal restrictions do they adhere? Why?

   2.6 What makes a woman decide to see trained midwife or traditional birth attendant for pregnancy check-up and assist at delivery?

   2.7 How much does it cost of such services?

   2.8 What type of advises do they usually obtain from trained midwife and traditional birth attendant?

   2.9 What do women view such advises? Do they follow? What are the outcomes of such practice?

3. Beliefs and practices regarding maternal and child nutrition

   3.1 Do they believe that a woman should adhere to food restriction during pregnancy and after delivery? What kind of food? Why?

   3.2 Breastfeeding and infant feeding practices, type of prelacteal food, what for?

   3.3 What do women desire of newborn baby size? Why?

   3.4 Women's perceptions of undernourished child, what causes of undernourished, severity, what can be done?

4. Childhood illness and treatment

   4.1 What are illness that children here experienced?

   4.2 What childhood illness are important and have worry mothers?

4.3 What is the most severe childhood illness here?

4.4 What is the most common childhood illness here?

4.5 What are illness causes?

4.6 What can be done to cure such illness?

4.7 Mothers' perceptions about childhood diarrhoea such as causes, severity, treatment, feeding practices during the course of diarrhoea.

4.8 Attitudes toward ORT.

5. Attitudes towards government health services

5.1 What sort of services do people expect to get from government health centre?

5.2 Desire characteristics of health personnel such as midwife, nurse, doctor and others?

B) Information to be collected from trained midwife and traditional birth attendant

1. Personal and socioeconomic background
2. Recruitment and training
3. What do they usually perform to women during pregnancy, delivery, and postnatal period?
4. What danger signs do they look for in women who are pregnant, about to deliver, and after delivery?
5. What do they usually do to treat such problems?
6. When do people normally request they to attend delivery?
7. Do people have to pay for booking and services? How?
8. Do they usually prescribe medicine to pregnant and lactating women? What kind of medicine? What for?
9. What prenatal restrictions do they usually prescribe? Why?
10. Do they give special advice to pregnant and lactating women? What type of advice?
11. With regard to the umbilical cord, what instrument do they normally use to cut the cord, how do they care the cord?
12. How do they usually treat a newborn baby?
13. Patterns of management of labour in case of normal and abnormal.